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THE IRON AGE

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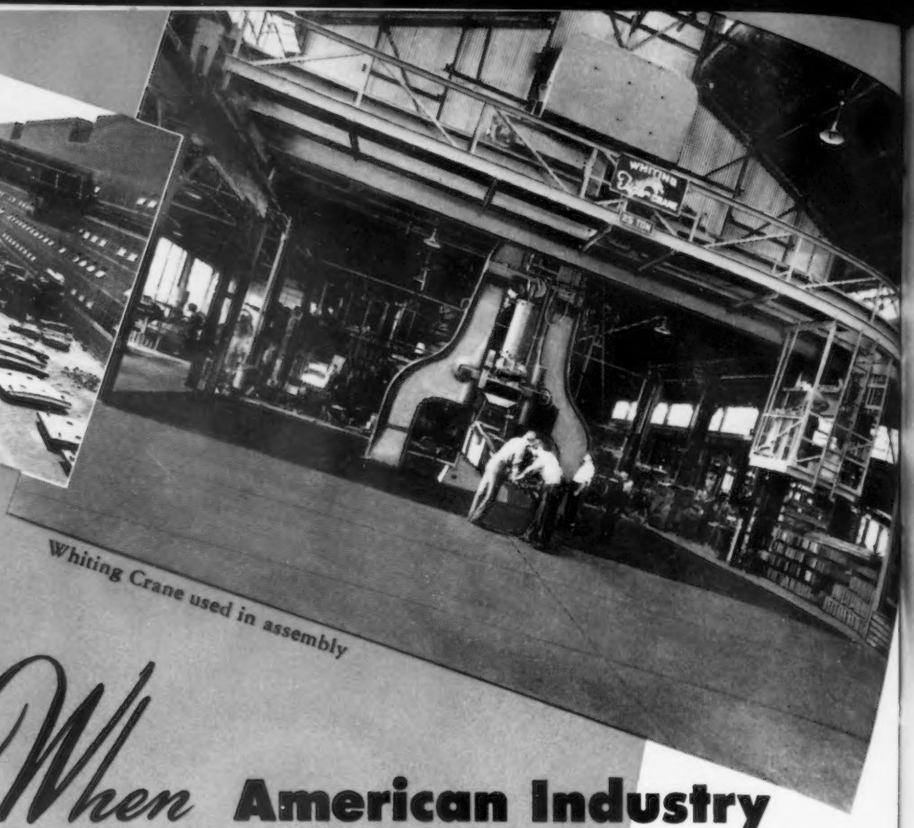
In the materials yard



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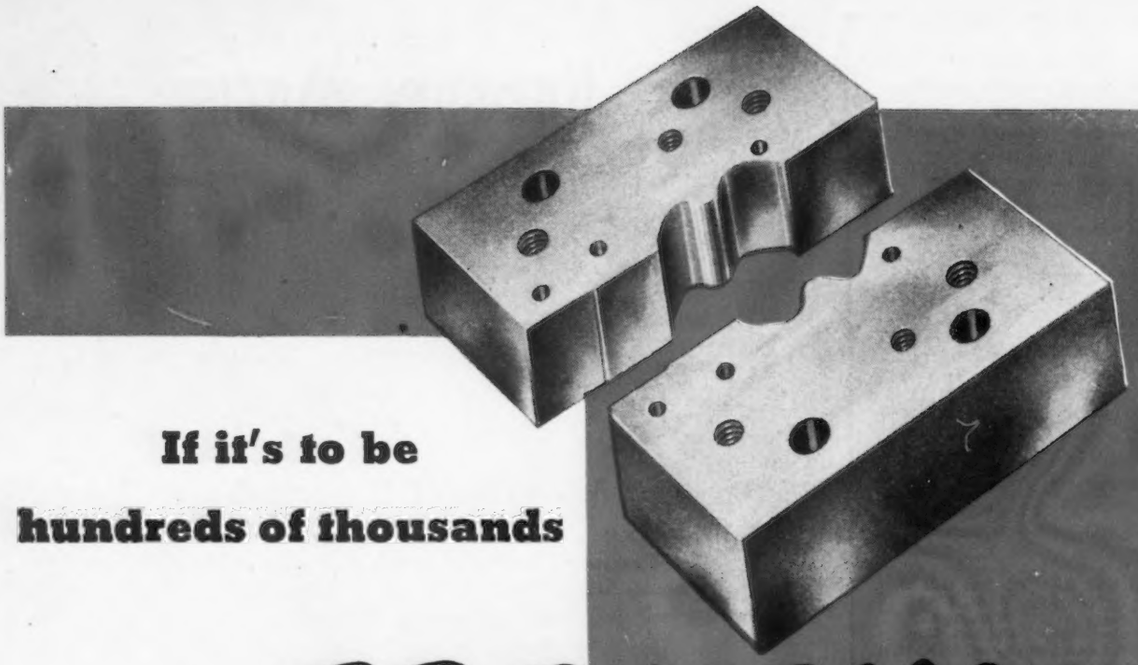

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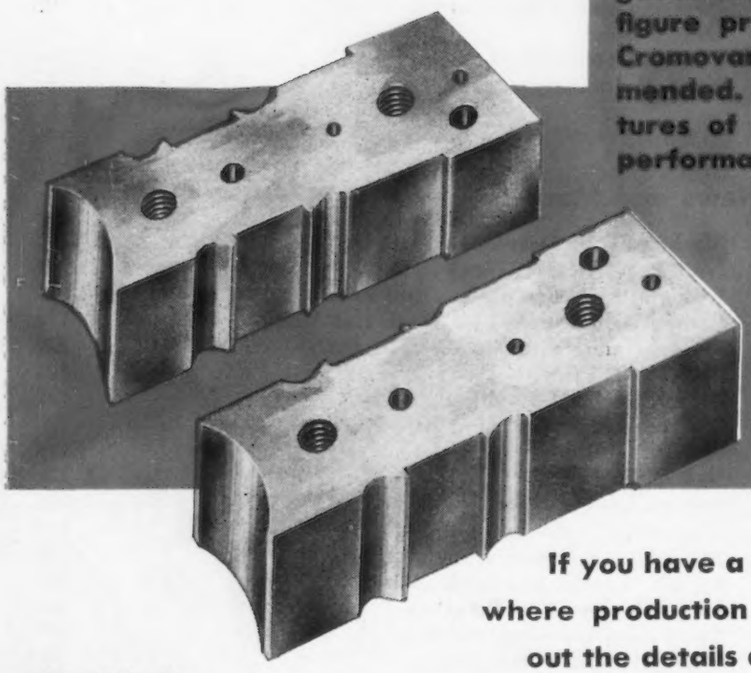

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Union Salesmanship

ANY worthwhile product, or service, can and should be sold on its merits. And the merits are measured by what benefit the customer gets from his purchase.

There are several simple cardinal rules about selling. One is that the salesman should not carry a gun or a blackjack. You cannot make satisfied customers by saying to the prospective buyer: "Purchase this or take a crack on the cocoanut." In the long run the law catches up with the practitioners of this method.

Unionism is a service that has merit and that should be, could be, but is not sold on its merits, either to its membership or to employers. The gun and the blackjack, metaphorically speaking, are still the chief selling arguments.

The closed shop and maintenance of membership, for example, are blackjacks threatening workers with the loss of jobs unless they buy union service, and keep on buying it. As a merchandising scheme it is on a par with compulsion, let's say, to buy Lifebuoy soap under penalty of otherwise not being permitted to bathe.

Another cardinal rule of selling is to avoid exaggerated promises of performance. If an automobile salesman promises a car performance of 100 miles per hour and 30 miles per gallon, and the customer finds that the actual performance is 50 miles in speed and 15 in fuel consumption, the buyer becomes a legitimate sorehead. I am afraid that there will be many such among the retail buyers of union membership now investing their savings in strikes on the promise of a 30 pct rise in wages. When the 30 pct bait turns out to have caught, at best, a 15 pct fish, the sucker market is likely to experience a "bust".

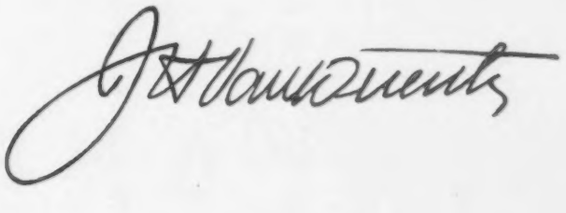
There is still another rule of merchandising overlooked by union promoters in dealing with employers. It is recognition of the fact that a well satisfied buyer, particularly one of prominence, is the best recommendation of other customers.

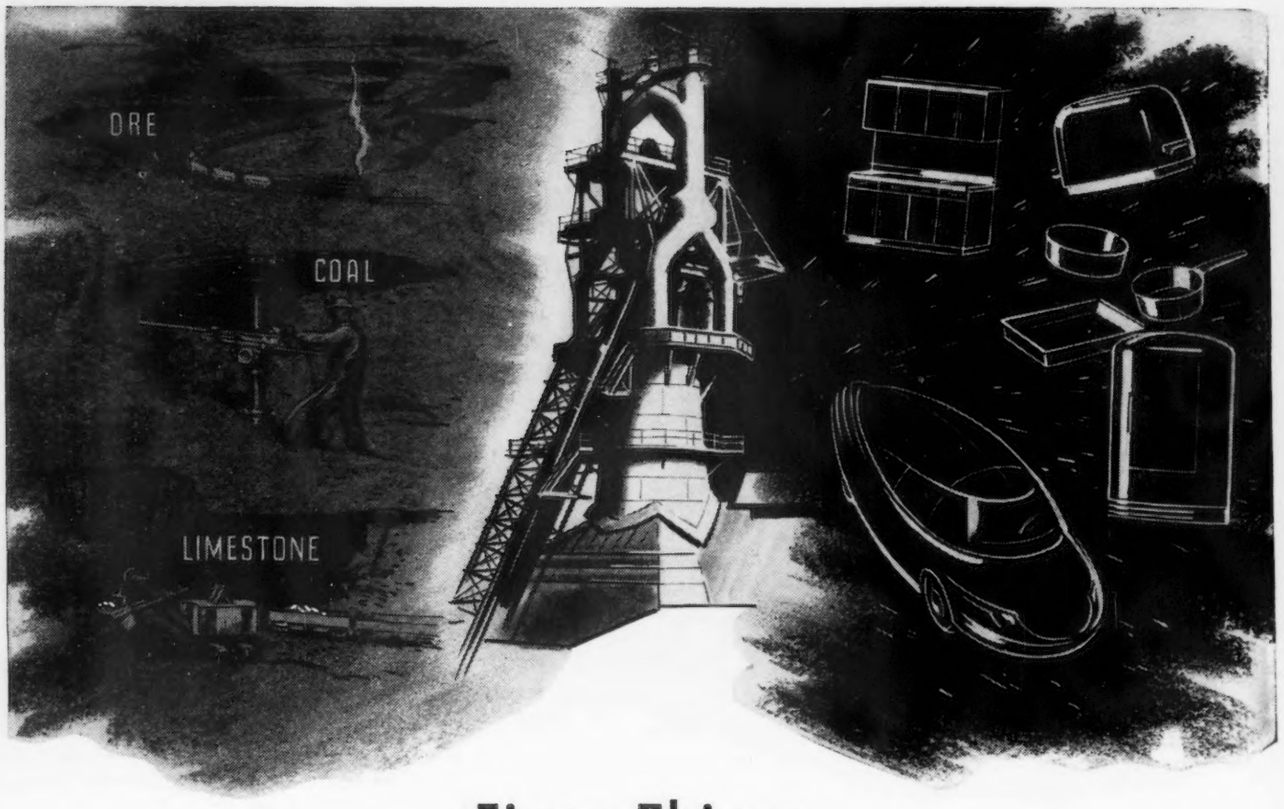
If you sold, for example, an expensive machine tool to the Ford Motor Co., and through poor workmanship, faulty material and inadequate service on your part, it broke down 700 times in operation in the course of two or three years, you could hardly expect a recommendation from that company.

The Ford Co. accepted the CIO contract hook, line and sinker. And what did it get for it? Over 700 work stoppages, not to mention slowdowns.

If there had been an ounce of merchandising sense in union headquarters it would have moved heaven and earth to make its relations with Ford a shining example of why and how it pays an employer to deal with a union.

Yes, the unions need better sales management if they expect to keep selling their services and keep these services sold. And since sales policies originate at the top, maybe they could benefit from an executive housecleaning.





Finer Things Are Coming Out of the Ground

From the ore ranges, the coal fields, and the limestone beds are coming vast quantities of blended iron ore, coking coal, and purest limestone — the principal ingredients for making steel, the "master metal" of our industrial age.

These ingredients are stored in huge stock piles at the Inland docks. Daily, thousands of tons of coal are made into coke, and this coke, with iron ore and limestone, is charged into blast furnaces—the first step in making controlled quality steel—the first step in producing the finer things that come to us from out of the ground.

Inland metallurgists are constantly testing and re-testing, melting and re-melting, adding one element and taking away another—always seeking for something better. Already they have contributed many new methods and new steels to American industry.

These, and the newer Inland steels which are coming from continued intensive research, will help you meet the needs of America.

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INLAND STEEL

The IRON AGE
Jan. 15, 1946

NEWSFRONT

► Automotive manufacturers find that electropolishing of stainless trim is disappointingly expensive since it must be supplemented by hand polishing. It is generally conceded that the use of this process might well be limited to drawn wire and plain surfaces.

► The bright nickel plating process has been used widely to spare polishing labor but it is recognized among users that for equivalent corrosion protection it is necessary to deposit a heavier weight of nickel than in dull nickel plating. The difference is thought to be caused by the presence of impurities, principally carbon.

► With mills anticipating a steel walkout on Jan. 14, plans of most had been fully matured to close down all operations on Jan. 12 to prevent equipment damage.

► The Kaiser-Frazer car body, designed for a front seat about 6 in. wider than conventional and a four-passenger rear seat is expected to be produced with about 250 body stampings per car fewer than customary. The body makes considerable use of 16 gage tubular sections and thereby reduces weight.

► To insure the success of any system of job evaluation, it must concern itself only with those factors which are actually required by the job itself. Realization of this produces results that are reliable and consistent and gives management a yardstick by which employes with qualifications better than those required by the current job can be upgraded.

► A survey of British farmers indicates a need for about 40,000 tractors per year over the next few years.

► In meeting the critical housing program, the Administration contemplates the use of existing temporary wartime facilities wherever practicable, the use of substitute materials for those in short supply when feasible, and work toward modification of local building codes.

► Under the Act authorizing the establishment of the Wage Stabilization Board, it will soon be announced that all wage decreases must first be submitted to that body for approval.

► Some observers of the industrial scene are of the opinion that some of the present labor-management difficulty may be due to absentee management of both industry and labor. Greater difficulty from this cause is seen for the future.

► It is little more than an even bet that the postponed steel strike will not come off Jan. 21. Main obstacle to a settlement this week may be the pressure from steel companies other than U. S. Steel. Some of these units have already expressed disapproval of the 15c. an hr offer made to the union.

► If the Corporation in its Washington meeting this week raises its offering, Philip Murray is expected to come down from his 19½c. bid already reduced from the original 25c. an hr demand. It is practically the first time in the history of the steel union that during such a tense situation a postponement has been made and the workers kept under control.

► In making its offer, the Corporation did so without being absolutely certain that the OPA would put through the $4 a ton increase in price--something which is not even official yet. This increase when it comes is to take care of accumulated costs in the past and any wage increases granted will be followed by a fresh demand for another price adjustment.

► Installations of the Decca navigator being prepared in Britain for aviation and marine use now call for two 3000-mile transmitters operating on extremely long wave lengths and making no demands on now-crowded wave bands.

Original plans were for a system with a range of 1200 miles with the necessity for switching from one set of signals to another in mid-Atlantic.

► Reports from Malayan tin interests continue to be confusing, with some government experts in Britain predicting production at 90 pct of capacity in 1946.

Tin producing firms, however, are listing their equipment in four stages of disrepair, only one group of which is expected to come into production in 1946.

▲▲ A gas turbine for installation in an ocean-going vessel is said to be nearing completion in an engineering works in the north of England. Reports indicate that economies up to 25 pct in operation are anticipated.

16-25-6 Alloy For Gas Turbines

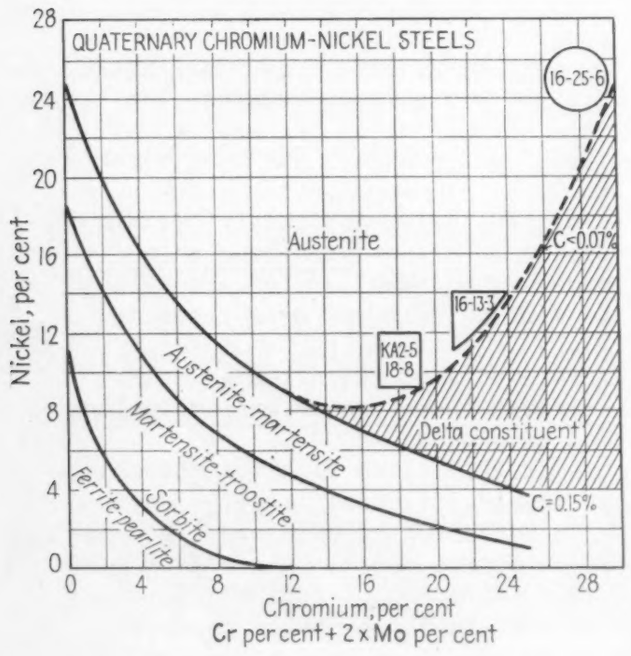
By MARTIN FLEISCHMANN
Metallurgical Engineer,
Timken Roller Bearing Co.,
Canton, Ohio

A new alloy,* developed for gas turbine and turbosupercharger applications, is described here by its developer. The alloy, 16-25-6, has high creep resistance at elevated temperatures, which has made it valuable in jet engine applications. This is the first of a two-part article.

FOR some decades engineers have been dreaming about the possibilities of constructing efficient gas turbines. Ever since the modern steam turbine development which produced one of the most efficient power units, comparatively simple in design and free from reciprocating parts, it was known that the same thermodynamic principles used there could be applied in the construction of gas turbines.

The thermal efficiency of a steam turbine depends largely upon the efficiency of the steam boiler where the heat energy locked up in the fuel has first to be transferred into steam, before it can be put to work in a turbine. Frequently these boiler installations constitute not only the major capital investment in the power unit, but also require large amounts of material and introduce additional industrial hazards. The fascinating possibility of introducing the burned fuel gas or oil from a combustion chamber directly into the turbine has long been in the minds of many. That this idea has never been worked out efficiently was due only to the lack of a suitable material of construction.

FIG. 1—Position of the 16-25-6 alloy in the quaternary chromium-nickel steel diagram.



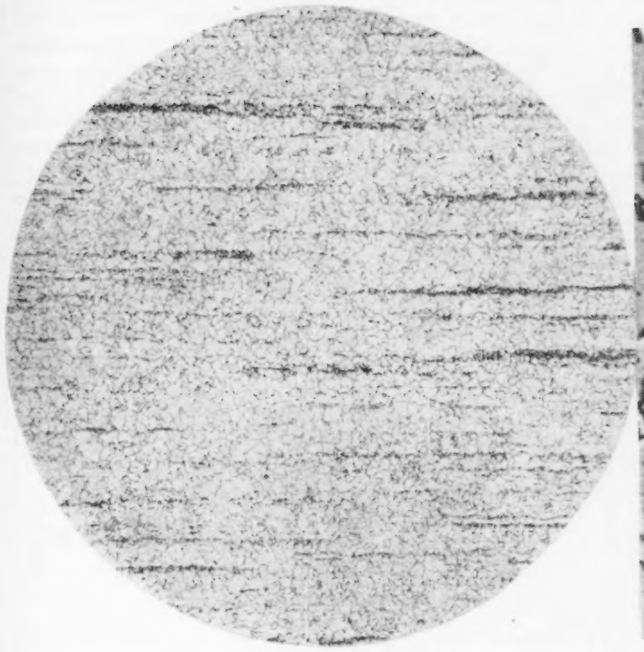
Gas turbines operating with gas at 1100° F were developed by Brown-Boveri in Switzerland, some years ago. They are running successfully and have in recent years found application in oil refineries in this country where they are used in connection with the Houdry process. Their thermal efficiency is low. Nevertheless, the use of these gas turbines is economical due to the large amount of waste gas available in the refineries and the simultaneous demand for compressed air.

The engineers knew that the thermal efficiency of this type of gas turbine could be increased from about 10 pct to better than 30 pct, competing successfully with steam turbines, in fact antiquating them in many services, if the turbine could be operated at 1500° F. In this case small and compact power units could be created which in their strategic and economic importance would challenge the imagination. Not only stationary power units could be set up in record time, but ships could be built without boilers. More efficient superchargers could be constructed to give the highest ceiling to present day airplanes, or a new type of flying ship using the gas turbine as a power unit could be developed which would operate on the principle of the rocket, eliminating the propeller.

* *Composition and process patents and trademarks either issued or applied for.*

† *For a previous article on steels for high-temperature applications, see* THE IRON AGE, *Nov. 8, 1945, "Selecting the Proper Heat Resistant Steel."*

It was a challenge to the metallurgists to meet the demand of the engineer for a material which would retain its strength while operating at red hot temperatures. The Timken Roller Bearing Co., which for many years had worked in the development of high-temperature steels, started to investigate this problem in 1940. Until that time the strongest steel for high-temperature service commercially available was the 16-13-3 composition on which Timken had been granted a patent a few years before.* This material, although nearly twice as strong as the stainless 18-8 steel at elevated temperature, still did not possess the creep and rupture strength at temperatures of 1200° to 1500° F demanded by the stress calculations made for the gas turbine.



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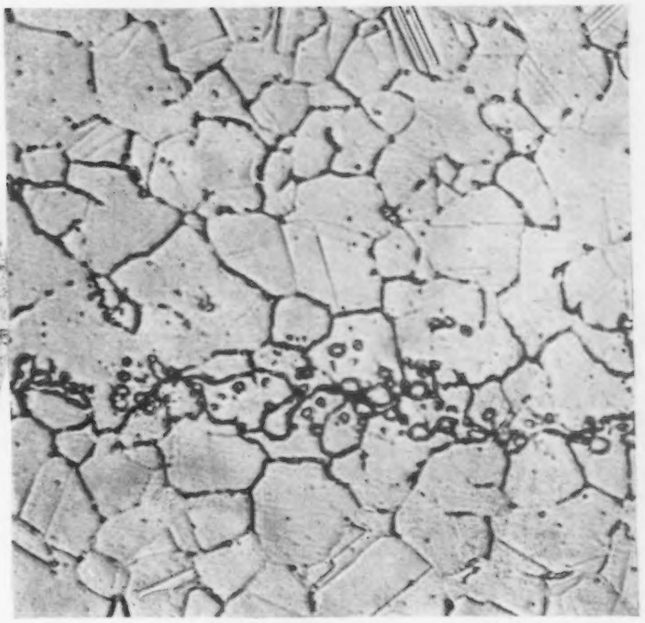

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FIG. 2—Microstructure of hot-rolled 1-in. round bars of 16-25-6 alloy, at 100 and 1000 X.

Nevertheless, the results obtained with the 16-13-3 steel pointed the way to a new material designated as 16-25-6 alloy. In arriving at its analysis, the assumption was advanced that it should be a ferrous material containing about 50 pct iron so that it would fit into the production of the Timken steel mill. The remaining half of the composition should then be made up of alloys balanced in such a way as to assure an austenitic microstructure, since it was known that austenitic steels possess superior strength at elevated temperatures. High creep strength alone was not sufficient. It had to be associated with good corrosion and oxidation resistance for service at the expected high operating temperatures. Due consideration also had to be given to the availability of the alloying elements.

Suggested service conditions indicated that 16 pct chromium would be sufficient to assure the required corrosion and oxidation resistance. Probably the most effective element in contributing high temperature strength to ferrous alloys is molybdenum. It was thought that 6 pct molybdenum could be introduced into the material without undue difficulties. To balance these amounts of chromium and molybdenum and assure a purely austenitic steel, free from delta iron, approximately 25 pct nickel is required, as may be ob-

* *Patented May* 24, 1938. *Patent No.* 2,118,683.

served from the chart, fig. 1. A low carbon content is desirable in order to assure good forging and welding qualities. The position indicated on the graph for the

RIGHT

FIG. 4—Effect of 12-hr tempering on the physical properties of 16-25-6 alloy, 1-in. round.

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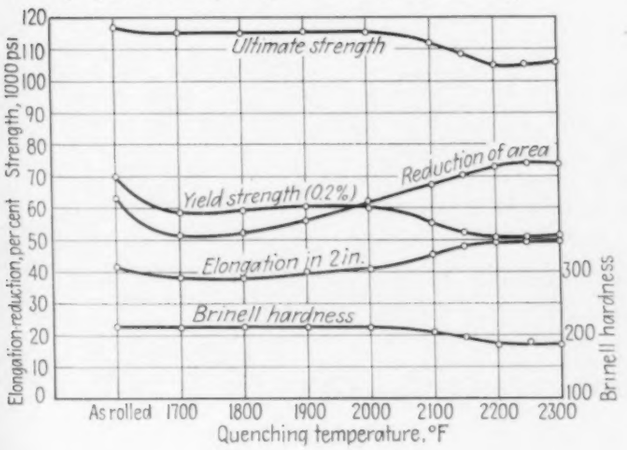
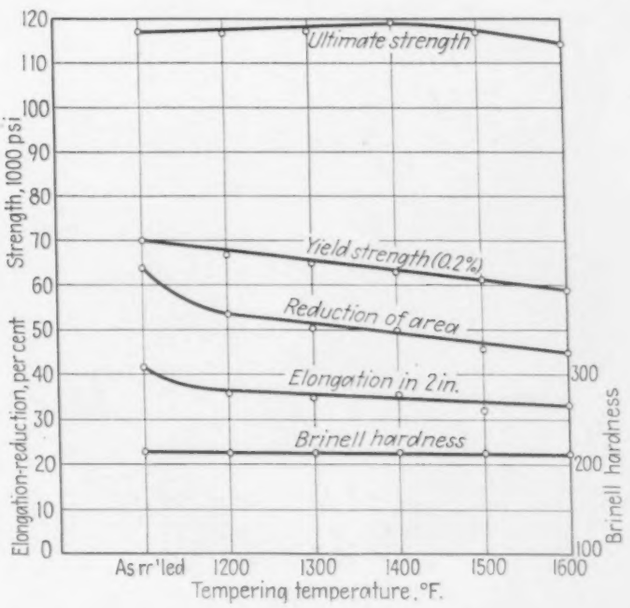
BELOW

FIG. 3—Effect of quenching temperature on the physical properties of hot-rolled 1-in. round, 16-25-6 alloy.





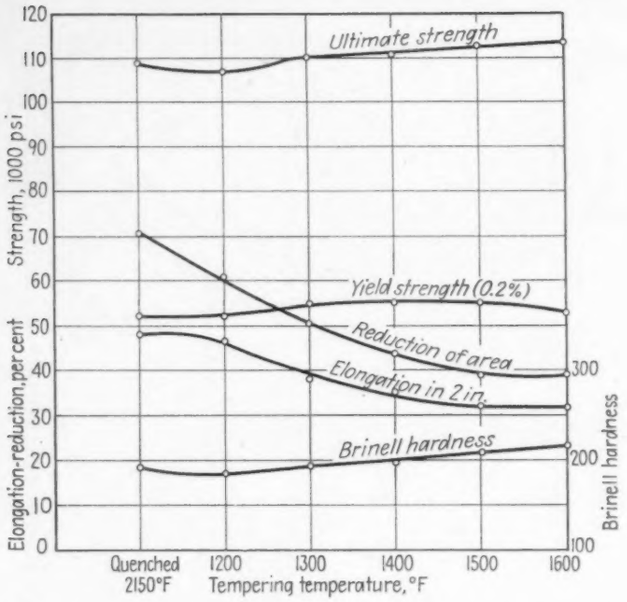


FIG. 5—Effect of 12-hr tempering on the physical properties of 1-in. round, solution-quenched, 16-25-6 alloy.

16-25-6 alloy indicates that the chosen composition should be free from delta iron. This constituent, if present in the microstructure, would not only lower the high-temperature strength of the material but also reduce its forgeability. Other elements known to increase the high temperature strength of ferrous materials are tungsten, vanadium, titanium, and columbium but all of these elements not only were in the class of strategic materials but also introduce certain melting difficulties. Nitrogen as an alloying element appeared to be most promising. It was plentiful and could be added to the melt in form of high nitrogen ferrochromium. Its effect is similar to that of carbon in increasing room temperature strength and stabilizing the austenite. Furthermore, it was thought that compared with carbides, the greater resistance of the nitrides towards spheroidization at elevated temperatures should have a beneficial effect upon the creep strength of the material.

Increased manganese content and a somewhat higher silicon content than considered normal appeared desirable, the first to further improve forgeability, the latter to add to the scale resistance of the material. The composition now may be written as follows:

Element	Pct
C	0.08 to 0.10
Mn	2.0 max
Si	1.0 max
Cr	16.0 aim
Ni	25.0 aim
Mo	6.0 aim
N	0.15 aim

The melting range given to the melt shop was the following chemical specifications:

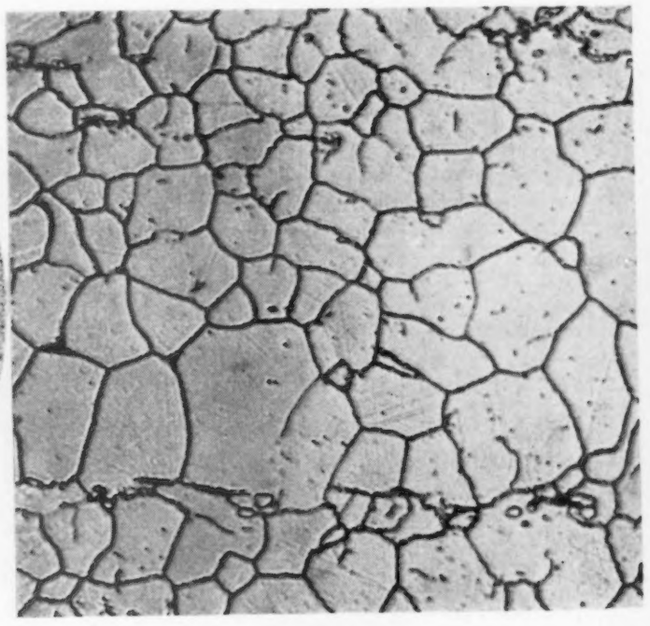
Element	Pct
C	0.12 max
Mn	2.00 max
Si	1.00 max
Cr	15.00 to 17.00
Ni	24.00 to 27.00
Mo	5.50 to 7.00
N	0.10 to 0.20

Production Problems Involved

Two 35-lb induction heats of the 16-25-6 alloy were melted to this specification in a laboratory high frequency furnace during August 1940. After some dis-

FIG. 6—Hot-rolled and tempered for 12 hr at 1200°F.

100X



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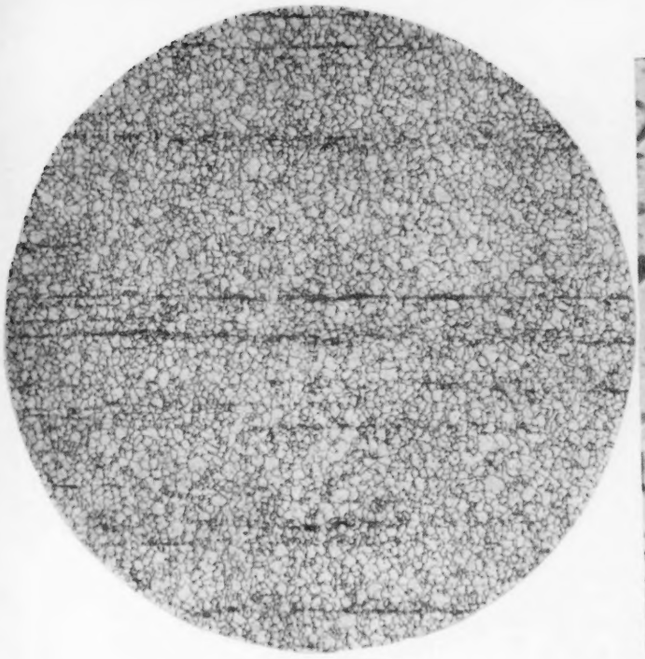

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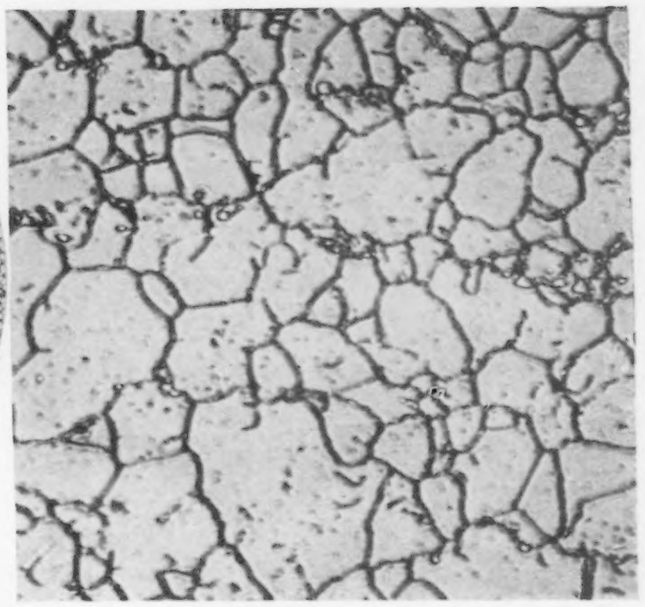


1000X

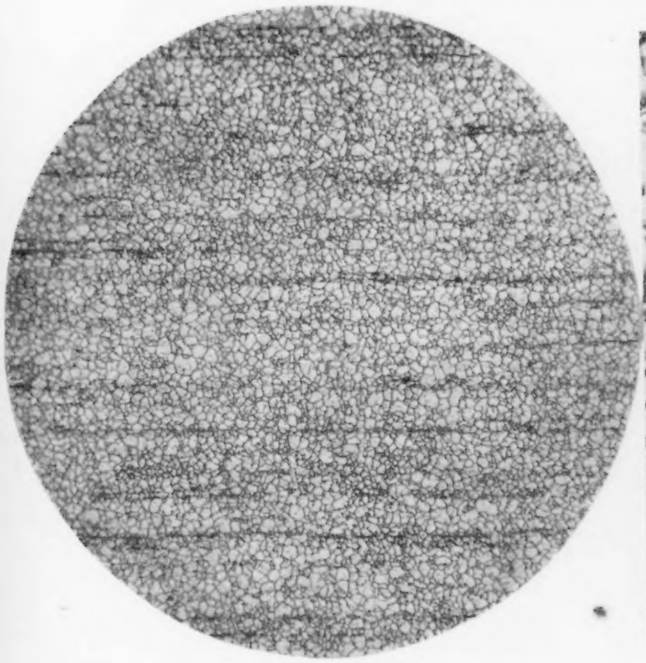
FIG. 7—Hot-rolled and tempered for 12 hr at 1300°F.

couraging forging experience, two 35-lb ingots were finally forged successfully into 1-in. round bars. Test specimens from these two heats were submitted to the University of Michigan for creep tests at 1300° F and 1400° F. The report received from the university for the high temperature characteristics indicated outstanding physical properties. In fact this material appeared to possess about four times the strength of the standard 18-8 steel and about twice that of the 16-13-3 composition at the temperatures tested.

It was a long step from these two small induction heats to actual production melts. The forging and rolling of this material presented considerable difficulties because of the exceptionally high hardness of the alloy at hot working temperature. However, by careful observation of the forging operation, combined with a study of the microstructures, a successful forging technique was developed. Standard rolling mills were not powerful enough to roll commercial ingots, and quite a number of rolls were broken. It was found necessary to use hydraulic forging presses to reduce the ingots to a billet size which could then be rolled. The maximum forging temperature was determined

(CONTINUED ON PAGE 50)

FIG. 8—Hot-rolled and tempered for 12 hr at 1400°F.



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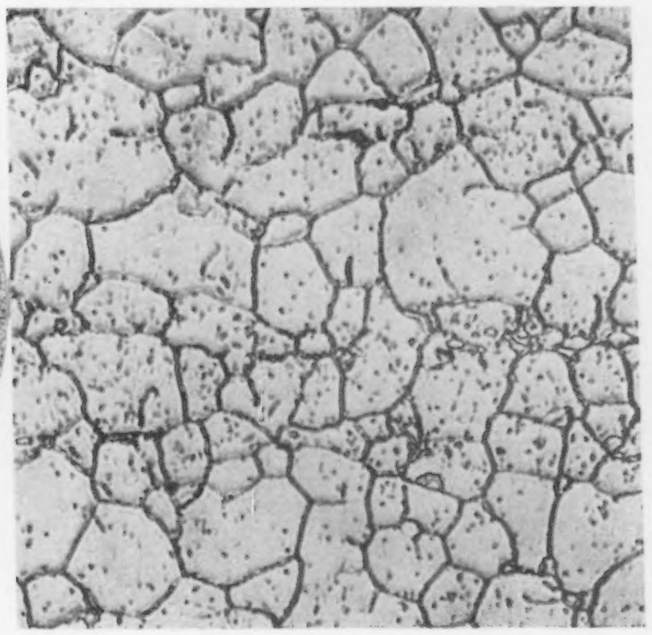

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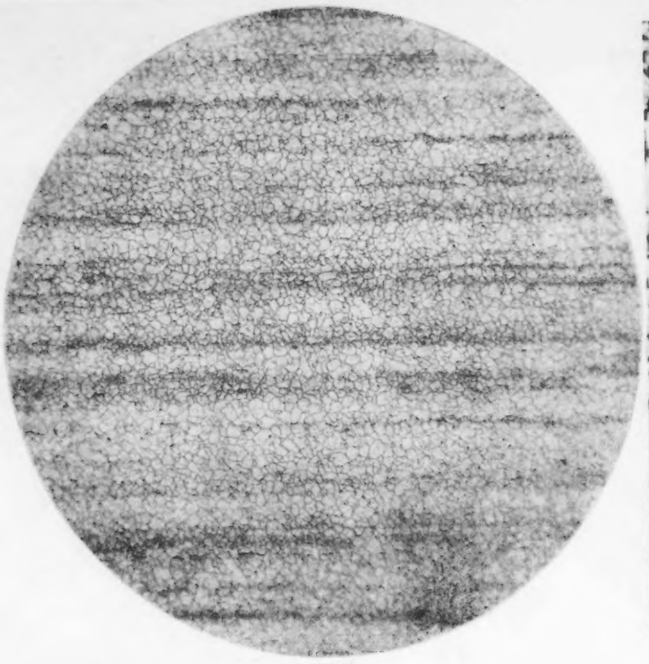

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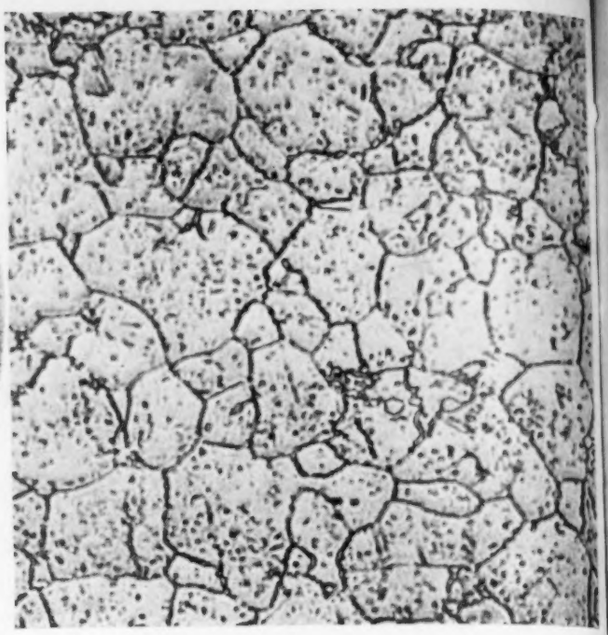

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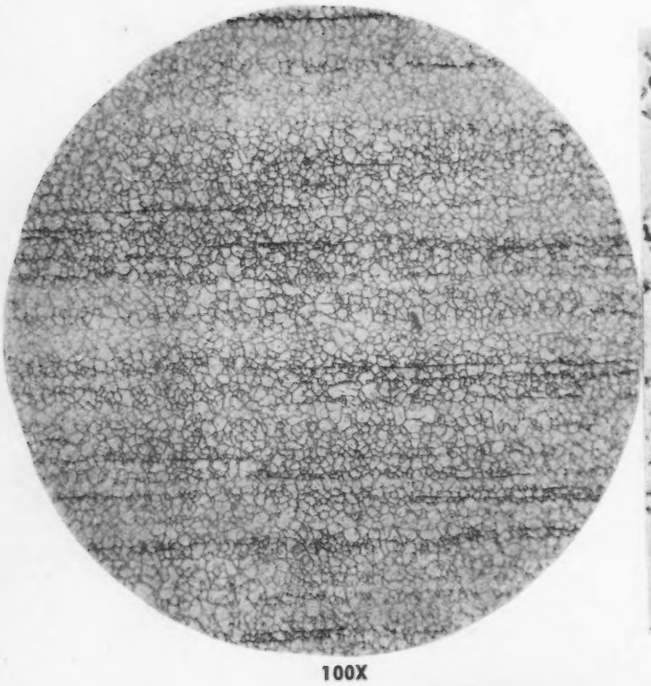

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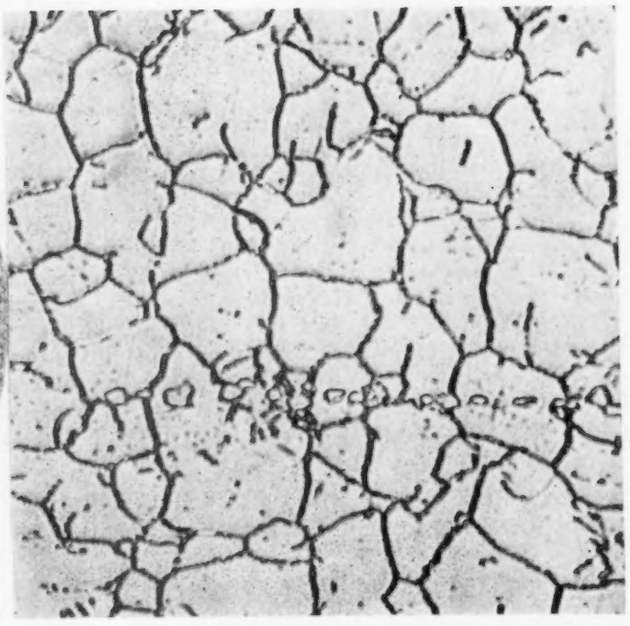


1000X

ABOVE

FIG. 9—Hot-rolled and tempered for 12 hr at 1500°F.

o o o

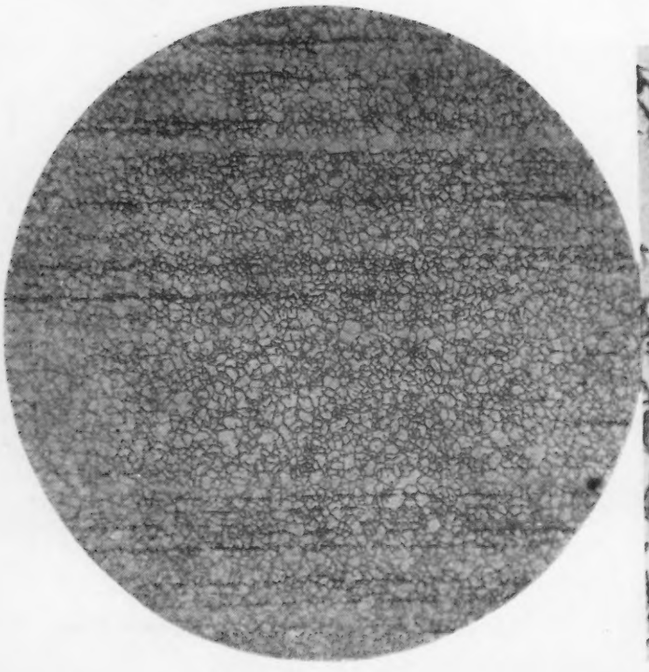
LEFT

FIG. 10—Hot-rolled, heated to 1700°F, and water-quenched.

o o o

BELOW

FIG. 11—Hot-rolled, heated to 1800°F, and water-quenched.



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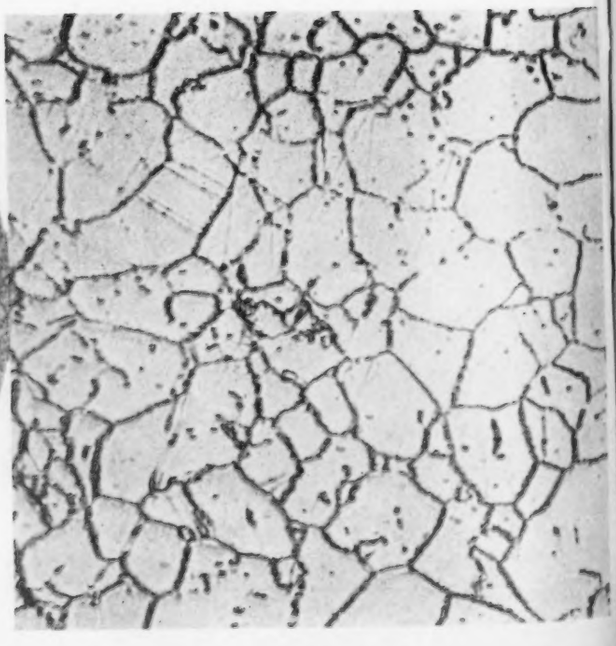

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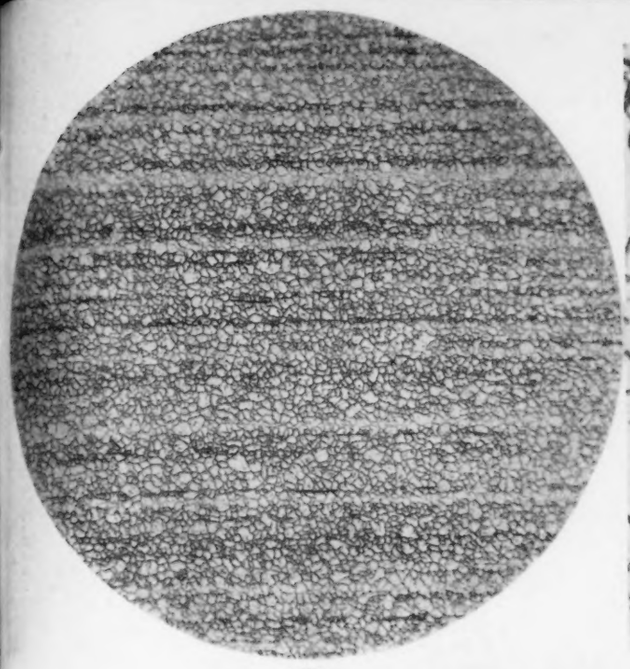

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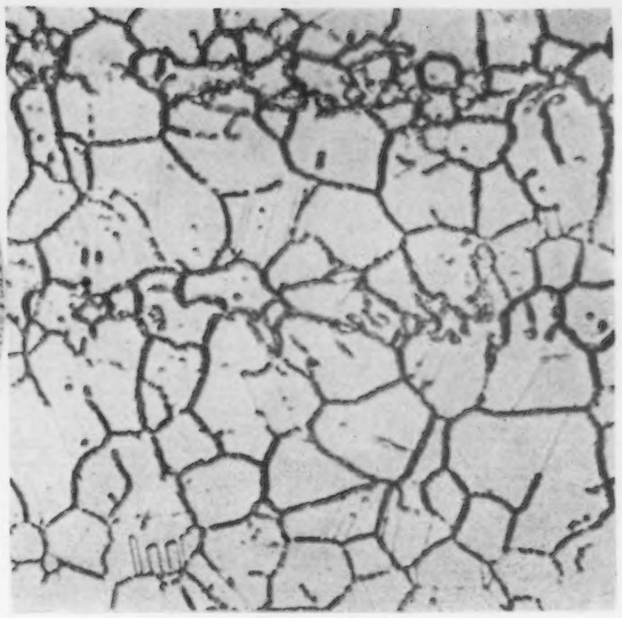


1000X

ABOVE

FIG. 12—Hot-rolled, heated to 1900°F, and water-quenched.

o o o

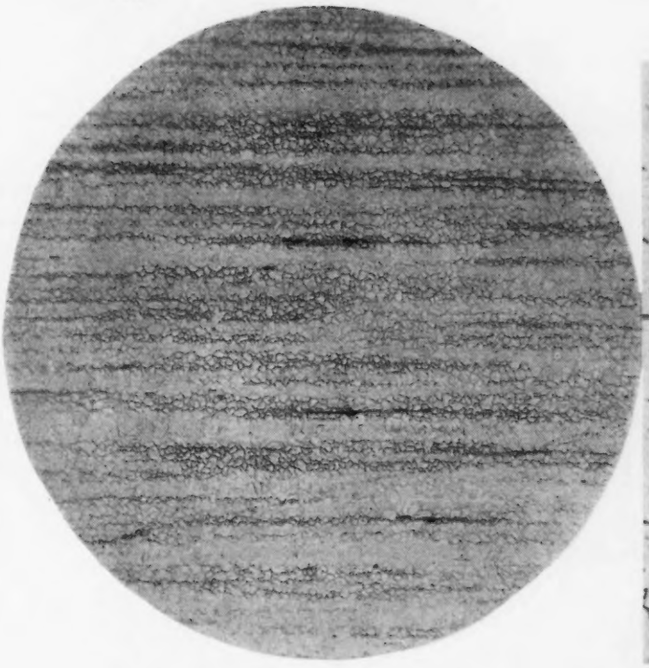
RIGHT

FIG. 13—Hot-rolled, heated to 2000°F, and water-quenched.

o o o

BELOW

FIG. 14—Hot-rolled, heated to 2100°F, and water-quenched.



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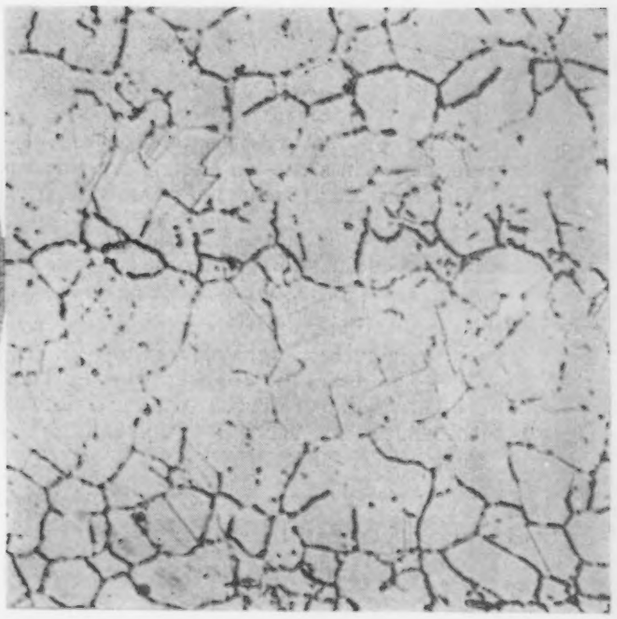

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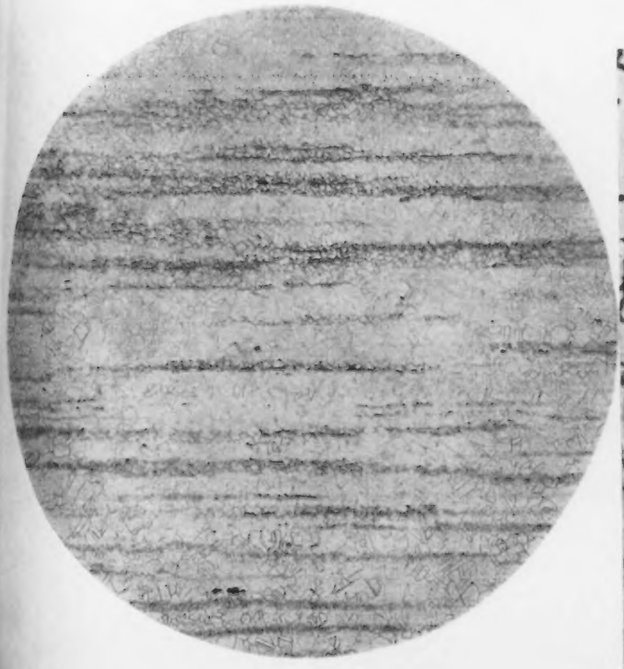

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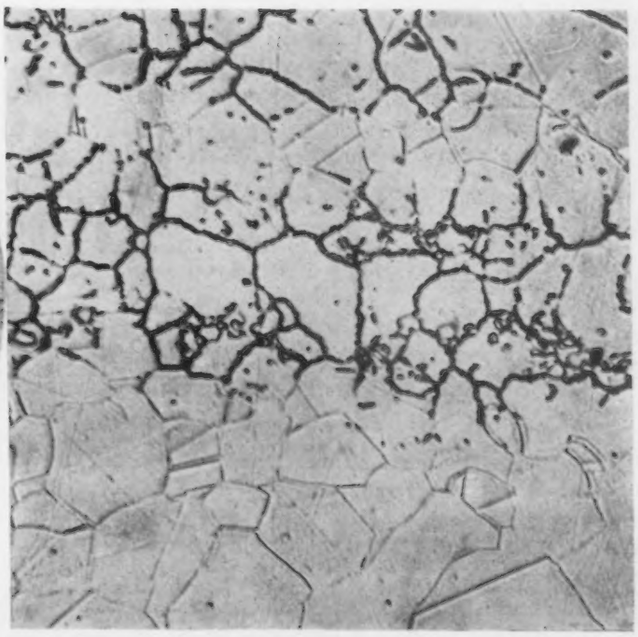

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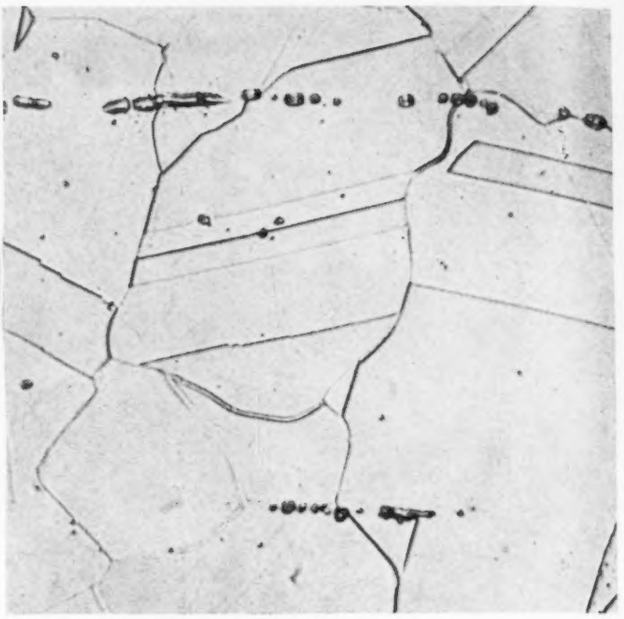


1000X

FIG. 15—Hot-rolled, heated to 2150°F, and water-quenched.

as 2000° F. The first heats produced commercially were melted in a one-ton electric arc furnace.

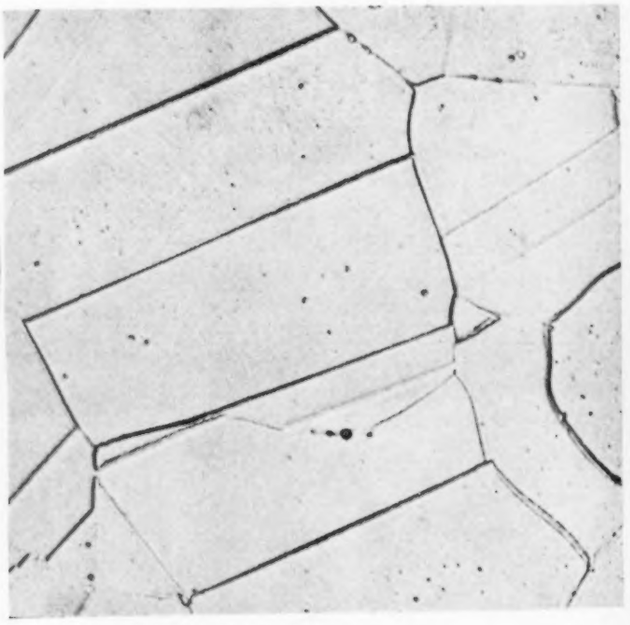
The new alloy found an immediate use, being in demand for the rotor wheels in turbo-superchargers. In fact, the demand for turbo-supercharger wheels increased so rapidly that very soon a 25-ton arc furnace had to be used for production. The material for this application was poured into 14-in. round corrugated ingots which were reduced to 8-in. blooms under a 1000-ton hydraulic forging press. These blooms were then hammer forged to 5-in. square billets and subsequently hot rolled to 4-in. square billets in a 16-in. tool steel mill. This size stock was furnished to the forger for the production of upset supercharger wheel forgings.

Room-Temperature Properties

Later, there was a demand for this new alloy for the large turbine wheels for jet engines. The forging bloom size required was an 8½-in. square. To assure sufficient reduction from the ingot to this billet size, 19-in. and 21-in. diam ingots had to be poured and the installation and use of a new 3000-ton hydraulic forging press was required.

FIG. 16—Hot-rolled, heated to 2200°F, and water-quenched.

100X



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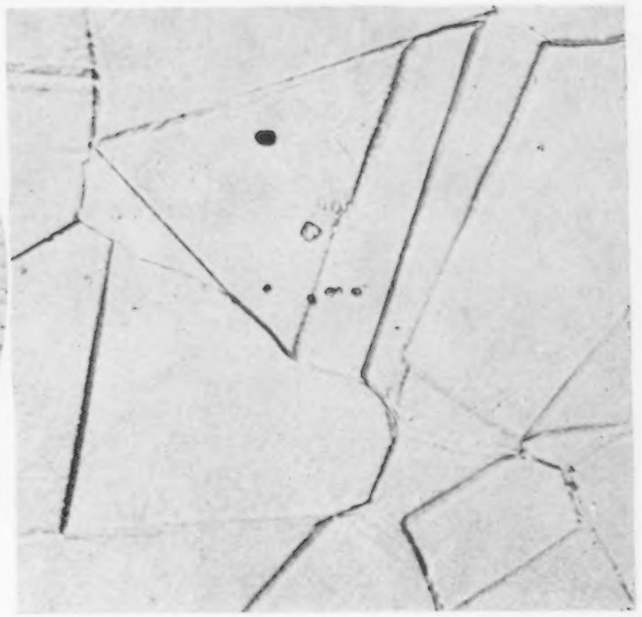


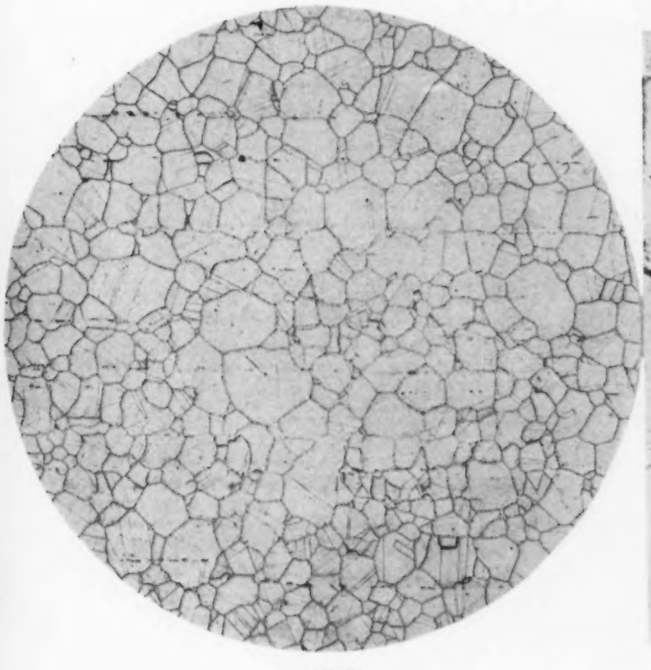
1000X

FIG. 17—Hot-rolled, heated to 2300°F, and water-quenched.

The 16-25-6 alloy is an austenitic material and nonmagnetic. Its structure, as observed in hot-rolled 1-in. round bar stock, is shown in fig. 2 and consists of austenite grains and another phase which has the appearance of carbides dispersed more or less in banded form. The effect of tempering treatments upon the physical properties of hot-rolled as well as solution-quenched material was studied on 1-in. round bars. The lowest quenching temperature that would produce solution of precipitate was determined in a test series indicating the effect of increasing quenching temperatures from 1700° to 2300° F, upon the physical properties. The samples to be quenched were held at the quenching temperature for 5 min. A soaking period of 12 hr was used for each tempering temperature from 1200° F, in 100° steps, to 1600° F. The tensile tests were made from standard 0.505 in. specimens.

The heat treatments given and the resulting physical properties obtained are incorporated in the graphs shown in figs. 3, 4, and 5. It appears significant that the highest yield strength and tensile strength are

FIG. 18—Solution-quenched and tempered for 12 hr at 1200°F.



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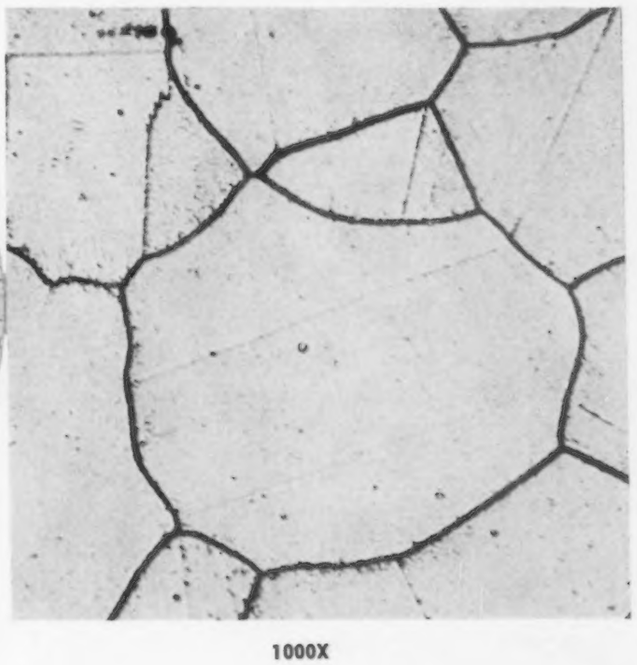

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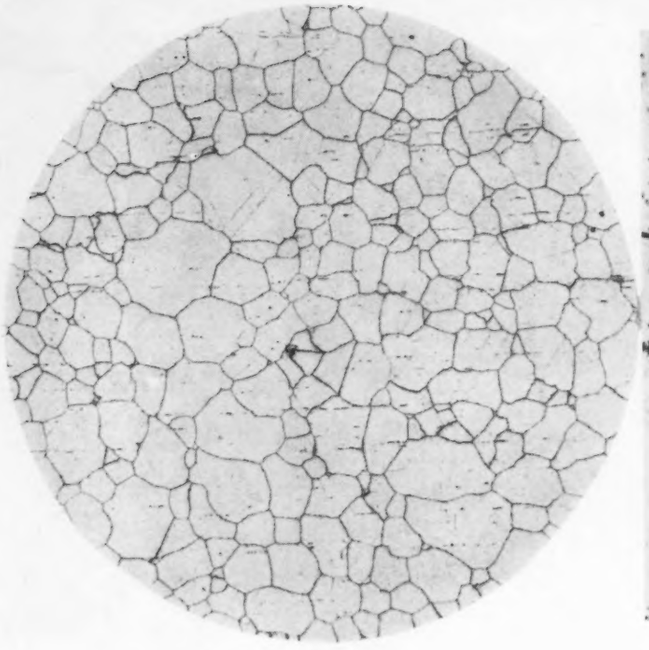

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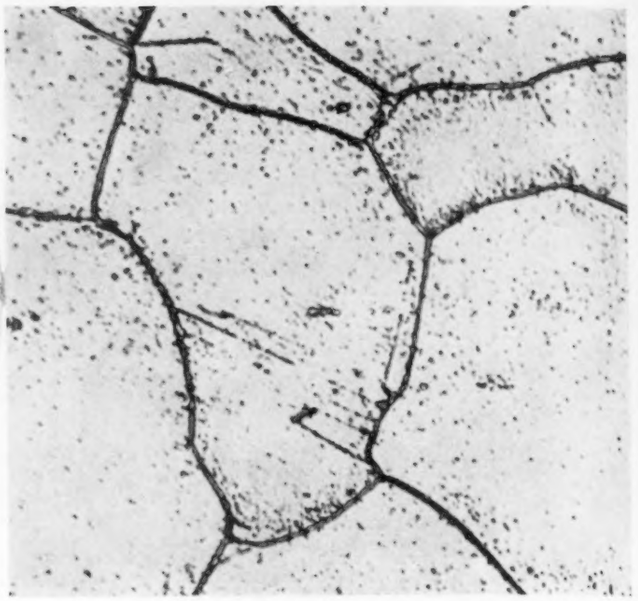


1000X

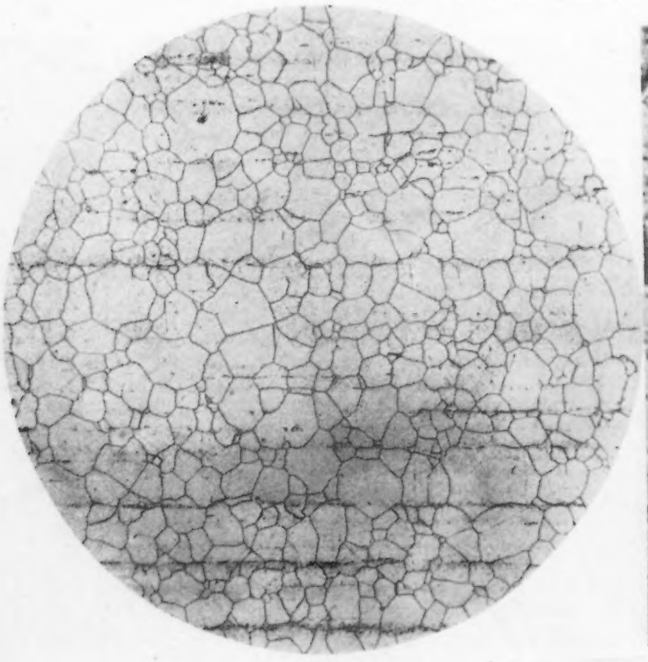
FIG. 19—Solution-quenched and tempered for 12 hr at 1300°F.

found in the hot-rolled material. No doubt this is caused by a certain amount of cold work retained in the hot-rolled material due to relatively low finishing temperatures in rolling. Tempering the hot-rolled material not only lowers its yield strength, but also markedly decreases the exceptionally high values for ductility found in the as-rolled material. This effect increases with increasing tempering temperatures, although an elongation of 33 pct and a reduction of area of 45 pct was still retained after 12 hr tempering at 1600° F.

The series of quenched samples reveal that maximum ductility, indicative of carbide solution, is accomplished after heating above 2150° F and quenching. These samples exhibited values for reduction of area better than 70 pct with 50 pct elongation. This, however, was balanced by a considerable drop in yield strength and about a 10 pct decrease in tensile strength.

The samples which were solution-quenched from 2150° F and tempered for 12 hr at successively higher temperatures from 1200° F to 1600° F exhibited the effect of precipitation hardening which reached a maximum at 1500° F, resulting in an increase of about

FIG. 20—Solution-quenched and tempered for 12 hr at 1400°F.



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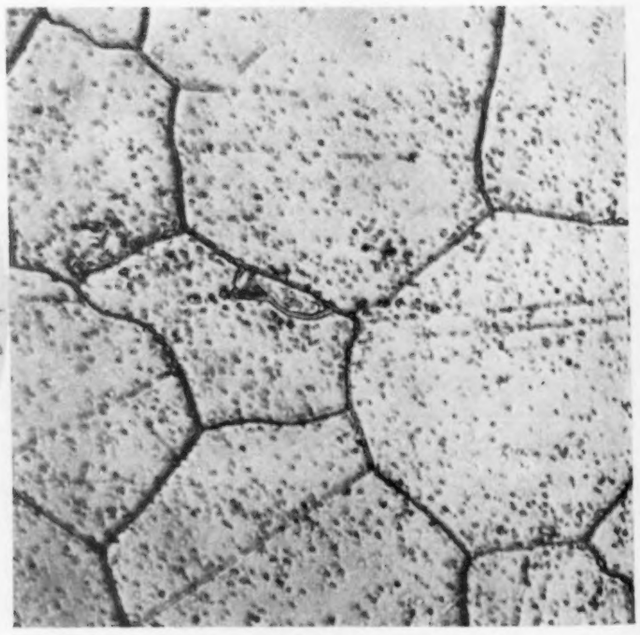

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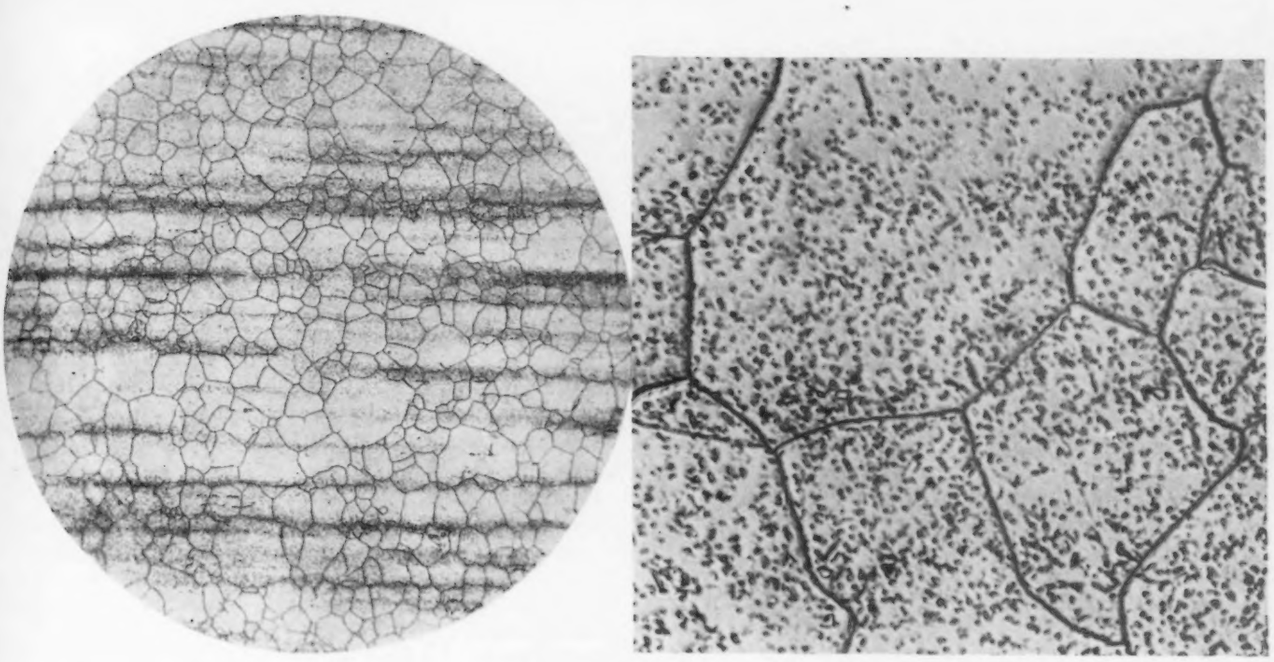


100X 1000X

FIG. 21—Solution-quenched and tempered for 12 hr at 1500°F.

10 pct in yield strength with a corresponding drop in ductility. However, the ductility values are still of a higher order of magnitude after 12 hr tempering at 1600° F.

The photomicrographs, figs. 6 to 9, illustrate the effect of increasing tempering temperatures upon the microstructure of the hot-rolled material. They clearly reveal the occurrence of progressive carbide precipitation with increasing tempering temperature.

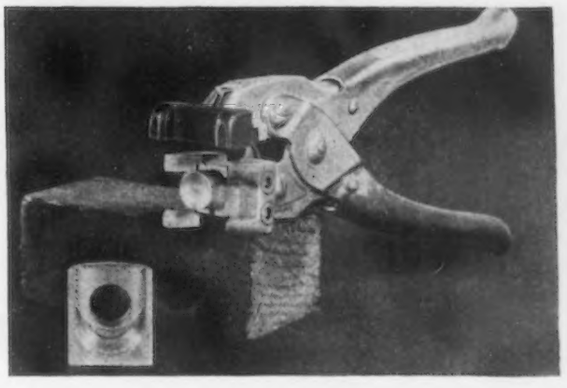
The series of photomicrographs, figs. 10 to 17, show the effect of increasing quenching temperature upon the microstructure of the hot-rolled material. Up to 1900° F, no marked change in the microstructure from the hot-rolled condition is apparent. The short holding time at the quenching temperature (5 min) did not produce much additional carbide precipitation, although increased twinning of the austenite grains is noticeable. At 2000° F, solution of the carbides has commenced as is indicated by the thinning of the grain boundaries. This solution of carbides has progressed at 2100° F, resulting in bands of new austenite grains free from carbides. At 2150° F, the solution of carbides has been practically completed as illustrated in the fully austenitic structure with its characteristic twinnings. Increasing the quenching temperature at 2200° F and 2300° F, respectively, did not materially alter the austenitic microstructure of the material with the exception that some indication of grain growth occurred. The lowest carbide solution temperature, therefore, has been established at 2150° F, confirming the results obtained from the tensile tests.

The photomicrographs, figs. 18 to 21, illustrate the effect of 12 hr tempers from 1200° to 1500° F upon the microstructure of the material previously solution quenched from 2150° F. At 1200° F, precipitation is noticeable around the grain boundaries extending with increasing drawing temperatures to within the grains. These precipitates have a tendency to coagulate at temperatures of 1500° F and above. No change in grain size occurred at any of these tempering temperatures. The grain size established by the quenching from 2150° F persisted.

This article will be concluded in next week's issue and will cover the effects of cold work on the physical properties of the alloy and upon its microstructure, its high-temperature properties and its possible applications.—Ed.

IN the manufacture of pistons for refrigerators, one operation consists of burring the individual half pistons. To do this, the workpiece is held in special pliers as shown in the illustration. The half piston is then pressed against a revolving brush made up of strips of Adolox cloth interwoven with the bristles. This combination proved to be a very good grinder; so much so that it was extremely destructive to the pliers, which stood up for only about four hours before having to be replaced.

A solution to the problem was found by brazing a Carboloy insert to the pliers on the portion which contacted the wheel. After two months of continuous service no appreciable amount of wear could be detected; the Carboloy portion had merely been nicely polished.



High-Pressure Feeding of

THE cavity formed in the feeder head differs greatly from the usual type in its formation because of the effect of gas pressure and internal heat evolution. These two factors plus the maintenance of fluidity of the interior for a longer period and the application of pressure to the whole surface of the liquid interior of the head are responsible for the formation of a cavity globular in shape.

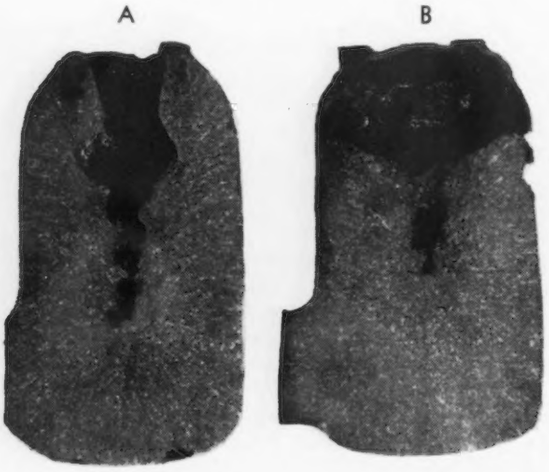
The great pressure on the whole liquid surface causes a meniscus to be formed. This is illustrated in fig. 6, which shows a comparison between the cavity formed in an atmospheric head and a gas-pressure head. In the former case the cavity is carrot shaped but is more compact than the cavity in the same type of head which utilizes ferrostatic pressure only. The gas-pressure head (B in the illustration) shows the globular shape of the cavity, occupying the top portion of the head with some secondary piping situated immediately below the semispherical gas cavity. This factor is the most important in determining head height so that a sound casting can be procured using the minimum height of head.

A pronounced meniscus is shown in head B, fig. 6, a phenomenon unknown in feeder heads before.

Macroetching of the heads shows differences in the crystal formation. In the atmospheric head columnar crystals are more pronounced and the direction of the ingrowing crystals is towards the center of the head and toward the last part of the head to solidify. In the case of the gas-pressure head, however, the columnar crystals are not so pronounced and the macrostructure gives evidence of finer crystals without any special orientation over the whole pattern.

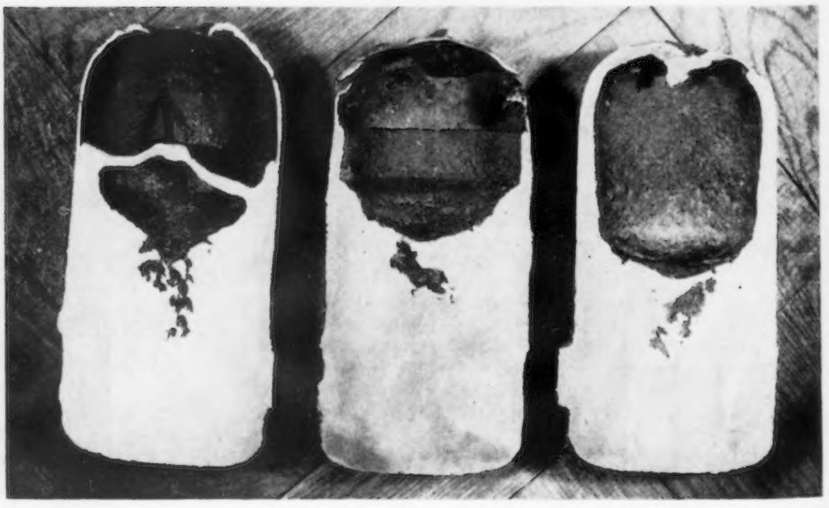
In fig. 7 sectioned heads are shown from an actual casting using varying gas pressures and the same delaying action of refractory paint. The differences are well shown in the photographs. The shrinkage cavity in the first head is caused by using 4 g of Kayell 6 while the second head cavity is formed by using 7 g of Kayell 6. The third head cavity was formed using 10 g of Kayell 6. Using the lower pressure caused a globular cavity which gradually changed to a blunt carrot type cavity, while the high pressure gave a more flat-bottomed cavity with very little secondary piping. The possible saving in the head metal over the orthodox type of head is obvious.

The methods for delaying the gas pressure action have been discussed and an illustration of the effect of one of these items is shown in fig. 8. This type of head had a double neck which accounts for the



ABOVE

FIG. 6—Shown here are the differences between a cavity formed in an atmospheric head (A) and a gas-pressure head (B). The cavity of the former head is carrot shaped while the gas-pressure head shows the globular shape of the cavity. Macroetching reveals differences in crystal formation. In the atmospheric head columnar crystals are more pronounced and the direction of the ingrowing crystals is towards the center of the head and toward the last part of the head to solidify. In B, the columnar crystals are less pronounced. Crystals are finer and without special orientation.



RIGHT

FIG. 7—Effect of varying gas pressure on sectioned heads. Shrinkage cavity of head on the left was caused by using 4 g of Kayell 6; center by using 7 g of Kayell 6 and the third by using 10 g of Kayell 6. It can be seen that high pressure produces a more flat-bottomed cavity with very little secondary piping.

Static Molds

Practical applications of this new method of utilizing gas pressure to a variety of static molds are described in the second part of this two-part article. The consistently high yield of castings to metal used and soundness of parts graphically illustrate the superiority of this process to older methods.

o o o

By S. T. JAZWINSKI
and
S. L. FINCH

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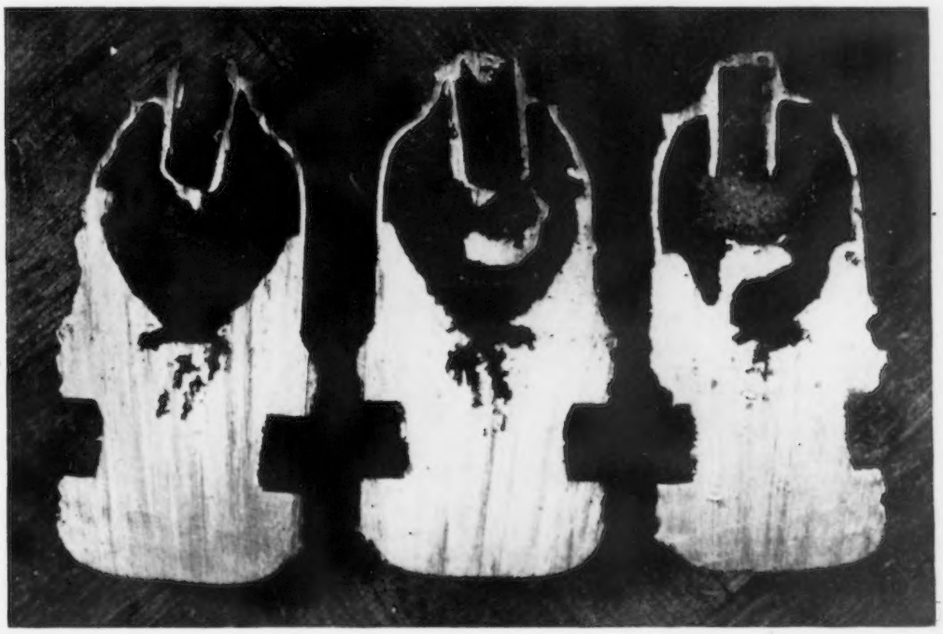
o o o

unusual shape of the lower portion of the head. The delaying action was controlled by packing a known weight of the compound in a steel tube. When the lower portion of the tube melted the compound began to react, evolving gas and heat. The result of the reaction was to produce the cavity as shown in fig. 8. In head B there may be seen a wire extending from the metal shell into the interior of the head. This was done to determine whether the protruding portion of the wire would remain unmelted and prove suitable for use in production purposes as a means of supporting the gas compound. As will be seen from this figure the wire remained unmelted and proved that the pressure pushed the metal quickly away from the top portion of the head.

This method of wiring the compound to the core print was used, therefore, in all subsequent work.

To obtain more data on the effects of different pressures employed, a casting was made using a



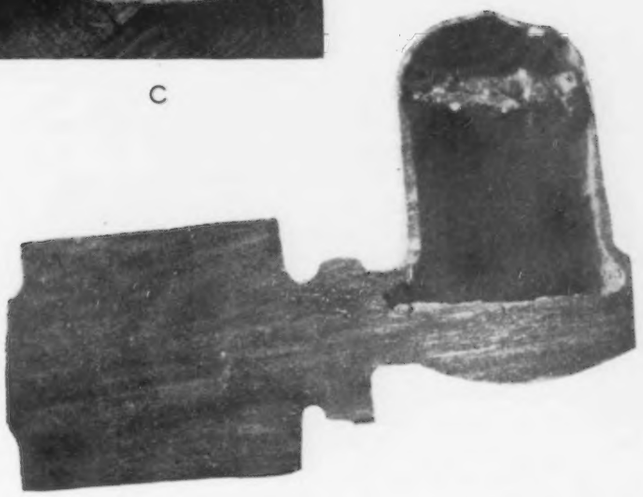
A B C

o o o

LEFT

FIG. 8—Effect of different delaying actions on sectioned heads. The wire seen protruding in B was used to support the gas compound and remained unmelted because the pressure pushed the metal quickly away from the top portion of the head.

o o o



o o o

RIGHT

FIG. 9—Sectioned head and casting produced when a pressure of about 15 atmospheres was used. Radiological examination showed the casting to be sound and yield of casting to liquid was quite close to theoretical limits.

o o o

ABOVE

FIG. 10—This sectioned head resulted from use of a pressure of approximately 30 atmospheres. This pressure was too great so that the mold top was lifted.

o o o

RIGHT

FIG. 11—Comparison of gravity, atmospheric, graphite rod (vertical and horizontal) and gas-pressure heads. (A) Blind swirl-gas head; (B) atmospheric head; (C) atmospheric head, using vertical graphite rod; (D) atmospheric head, using horizontal graphite rod; and (E) gas-pressure head.

pressure of approximately 15 atmospheres. The result obtained was extremely interesting, as shown in fig. 9. The cavity is practically the whole of the feeder head and more or less a complete shell. The thin shell or case of solidified metal obviously acted as a cylinder while the gas pressure acted as a piston and the liquid steel was the medium compressed. Radiological examination showed the casting to be sound and the yield of casting to liquid metal was quite close to the theoretical limits.

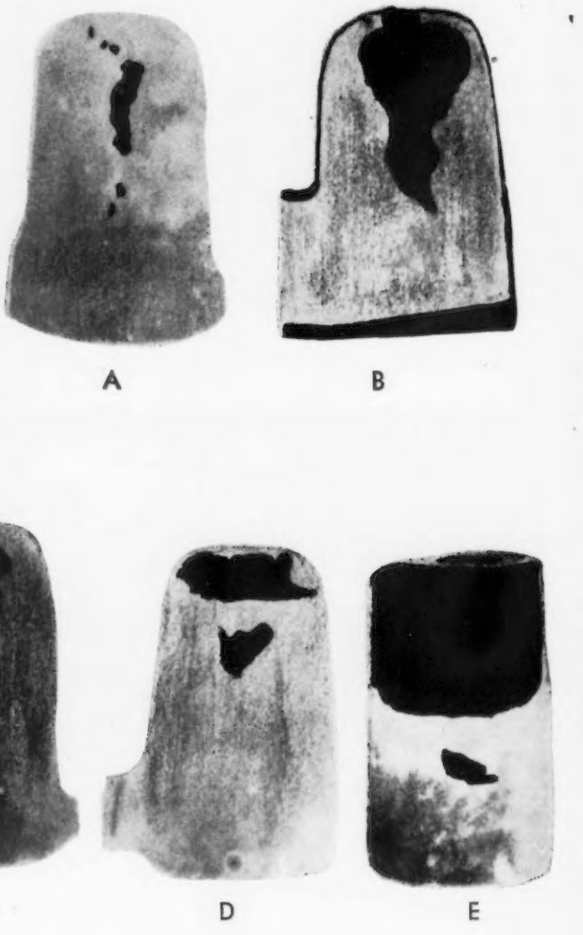
In fig. 10 is shown a feeder head which was used with a still greater pressure of approximately 30 atmospheres. The pressure employed was too great and the mold top was lifted. Back pressure was so intense that the metal was pushed through the thin solid shell forming the contour of the casting. The feeder head is only a thin case of neck and head contour with a thickness of 1/16 in. on top, ⅛ in. on the bottom and 1/16 in. in the neck. The bowl is ¾ in. thick in solid metal and the surface of the metal was smooth and polished.

A comparison of gravity, atmospheric, graphite rod (vertical), graphite rod (horizontal) and gas pressure heads is shown in fig. 11.

Use of Gas Pressure Head

The first casting made using controlled gas pressure is shown in fig. 12. This is a simple bearing cap which has given trouble in the past when using normal gravity heads. Low yield was obtained with excessive cutting off and dressing operations and, in addition, it was difficult to obtain a completely sound casting. The introduction of the atmospheric head resulted in increasing the yield from 40 pct to 55 pct and reducing the dressing time. The sectioned castings are shown in fig. 12 and are perfectly sound. The head cavity is very interesting showing the flat-bottomed type of cavity with small secondary shrinkage. The use of the gas-pressure head raised the yield from 55 pct to 70 pct resulting in a saving of 336 lb of liquid steel per ton of castings produced.

Sections of a simple casting which was made using the gas-pressure feeder head are illustrated in fig. 13. Utilizing the orthodox type of gravity heads, a yield of 50 pct was possible, while the introduction of the atmospheric head increased the yield to 63 pct with decreased dressing time. The yield obtained using a gas-pressure head was 73.9 pct. Observing the sectioned head it can be seen that a further increase in yield would have been possible, but due to pressure of work, this was not proceeded with as the



yield of 73.9 pct was considered impressive for this type of casting.

Fig. 14 shows a sectioned cover casting which is slightly heavier and more complex than the previous illustration. Using gravity heads a yield of 52 pct was obtainable, while the introduction of the atmospheric head increased the yield to 61.7 pct and decreased dressing costs. Using a gas-pressure head a perfectly sound casting was produced with a yield of 71.4 pct. The sectioned head shows more secondary piping than usual, although once again the flat-bottomed cavity is exhibited.

In fig. 15 is illustrated a tram wheel which had been made in the past using gravity heads giving a low yield of 47.4 pct, although sound castings were produced. When an atmospheric head was used this had to be of the double-necked type, and a comparatively low yield of 59.2 pct was obtained, although the decreased dressing costs were pronounced.

The gas-pressure type of head was applied to the casting and again a double-necked type of head was necessary which does not lend itself to exceptionally high yields. A sectioned casting produced with a gas-pressure head is shown in fig. 15. A careful examination of the sectioned casting shows that changes in section do not affect the soundness of this casting which was produced with a yield of 70.6 pct. The section through the feeder head shows the typical globular cavity associated with gas-pressure heads plus a small amount of secondary shrinkage.

The bracket illustrated in fig. 16 has been chosen to show that the heavier sections of a compact casting prove to be free from internal defects when made with a gas-pressure head. The yield obtained in this particular case was 76 pct as against 63.9 pct using the atmospheric head.

After the methods of gas-pressure heads had been successfully applied to smaller castings, those of the heavier type were made, with no special precautions being taken, and, as shown in fig. 17, the gear case was produced with two gas-pressure heads at the sides and one atmospheric head in the center. The yield obtained in the production of a sound casting was 80 pct. The sections of the gas-pressure heads are shown in fig. 18. Although this casting was produced successfully with these three heads it was decided to try to make this gear case without the aid of the center atmospheric head.

When the atmospheric head was removed, it was

LEFT

FIG. 12—Sectioned bearing caps. These were the first castings made using controlled gas pressure and are perfectly sound. Use of the gas-pressure head saved 336 lb of liquid steel per ton of castings.

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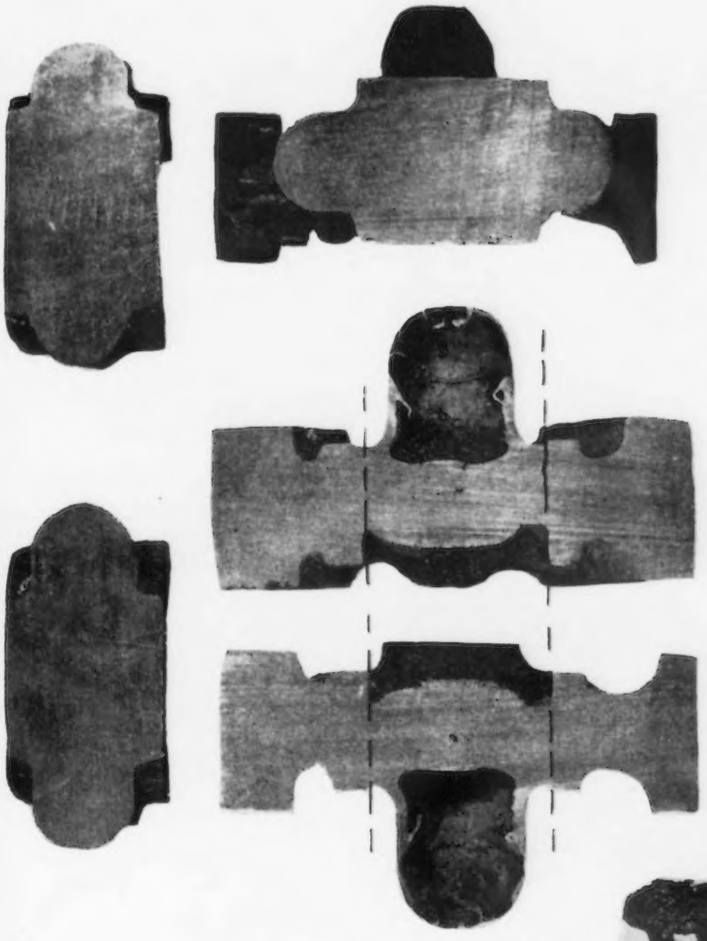
BELOW

FIG. 13—Sectioned bracket made with gas-pressure head. Yield obtained using gas pressure was 73.9 pct.



found possible to produce a sound casting with only two gas-pressure heads, raising the yield from 80 pct to 87.1 pct (see fig. 19).

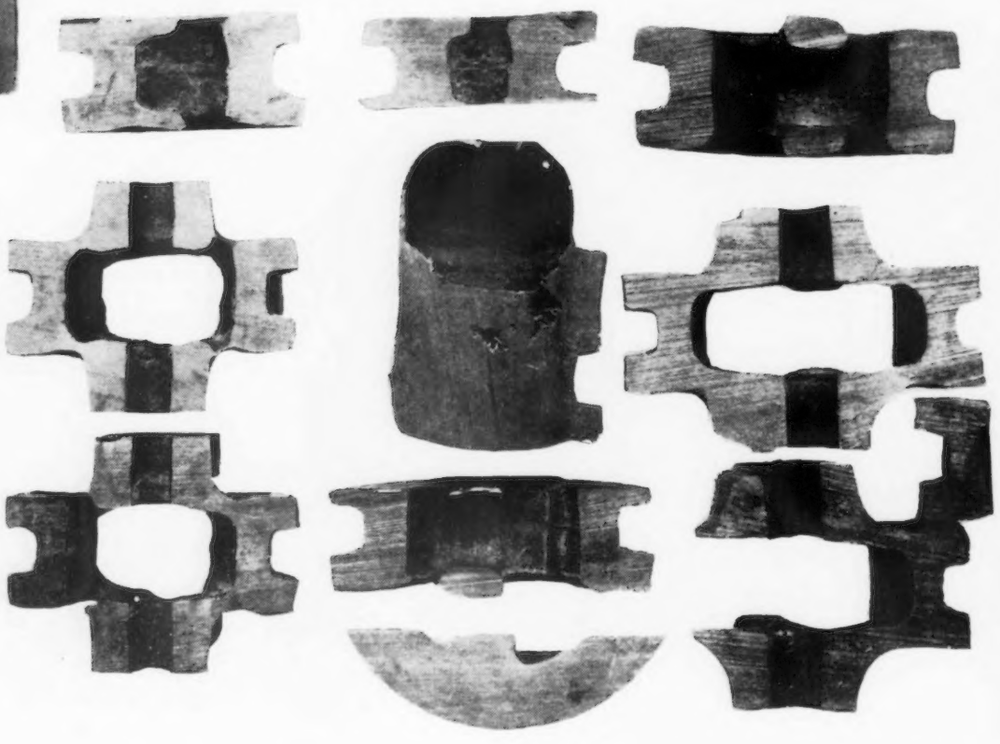
Having made castings ranging in weight from a few pounds to 500 lb, castings were then chosen because of their intricacy or bad design where the heads of normal size trouble due to shrinkage. The method of feeding using one gas-pressure head proved to be successful as shown in fig. 22 with a yield of 76.0 pct.

The girder casting shown in sections in fig. 23 weighed approximately 300 lb and was successfully fed using only one gas-pressure head. The sections show that a sound casting was produced and a meniscus is clearly shown in the head. Practically the theoretical yield was obtained on this casting, namely the exceptionally high figure of 95.1 pct.

Economies of Gas Pressure Head

A comparison between the three static methods of feeding, that is, gravity, atmospheric and gas-pressure heads, will be useful in illustrating the economic aspect of the latter. To compare the two most efficient methods of feeding, that is, utilizing the atmospheric and gas pressure, a spring-base bracket casting was selected and used as a standard. The two main factors to be observed were yield and soundness. At this stage of the investigation no accurate information was available on the comparison of these two factors. All the castings produced by the standard method were sectioned in the same position (see fig. 25).

Using normal gravity heads, approximately a 50 pct yield was obtainable and with this low yield the soundness of the casting was maintained. The next



ABOVE

FIG. 14—These sections of a cover casting show that the use of a gas-pressure head resulted in a perfectly sound casting with a yield of 71.4 pct. The head of this casting, however, showed more secondary piping than usual.

o o o

RIGHT

FIG. 15—Examination of these sectioned tram wheels indicates that changes in section do not affect the soundness of this casting which was produced with a yield of 70.6 pct.

founder usually experiences trouble. Valve bodies were cast, two in each molding box using three gas-pressure heads for the two castings. One valve body is shown sectioned in fig. 20 which was satisfactory with a yield of 67 pct.

The roller bracket shown in fig. 21 is an example of where a sudden change in section occurs frequently throughout the casting. This either leads to low yield, due to excessive head metal, or with step was to apply the atmospheric head, and, when the method of feeding and gating the casting was standardized, as shown in fig. 24, a yield of 75.9 pct was obtained, but, as will be seen from fig. 26B, the casting was unsound and exhibited shrinkage cavities in several sections. A further decrease in yield to 73.2 pct (fig. 27C) still proved the atmospheric head insufficient to give absolute soundness as porosity was revealed chiefly at T sections. When the

ABOVE

FIG. 16—This sectioned bracket clearly shows that the heavier sections of a compact casting prove to be free from internal defects when made with a gas-pressure head.

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FIG. 17—This gear case was produced with two gas-pressure heads at the sides and one atmospheric head in the center.

Summary

Summarizing, it should be said that not one but all factors must be considered in designing the gating and feeding system of any one casting. After this can be studied the question of using pressures higher than atmospheric.

This pressure is caused by gas and it can only be effective if it acts on the whole liquid mass of metal in the riser. Due to high conduction losses, the initial heat of the steel is not sufficient to keep the whole mass of metal in the feeder head fluid for any length of time and so, to maintain fluidity, it is necessary to add additional heat energy in the feeder head or to lower the solidification temperature of the metal or both.

The gas producing compound used contains a certain amount of material giving an exothermic reaction on being subjected to heat which maintains the head fluid for a longer period of time, and in so doing, allows the pressure to be exerted on the whole area of the head, resulting in the meniscus effect.

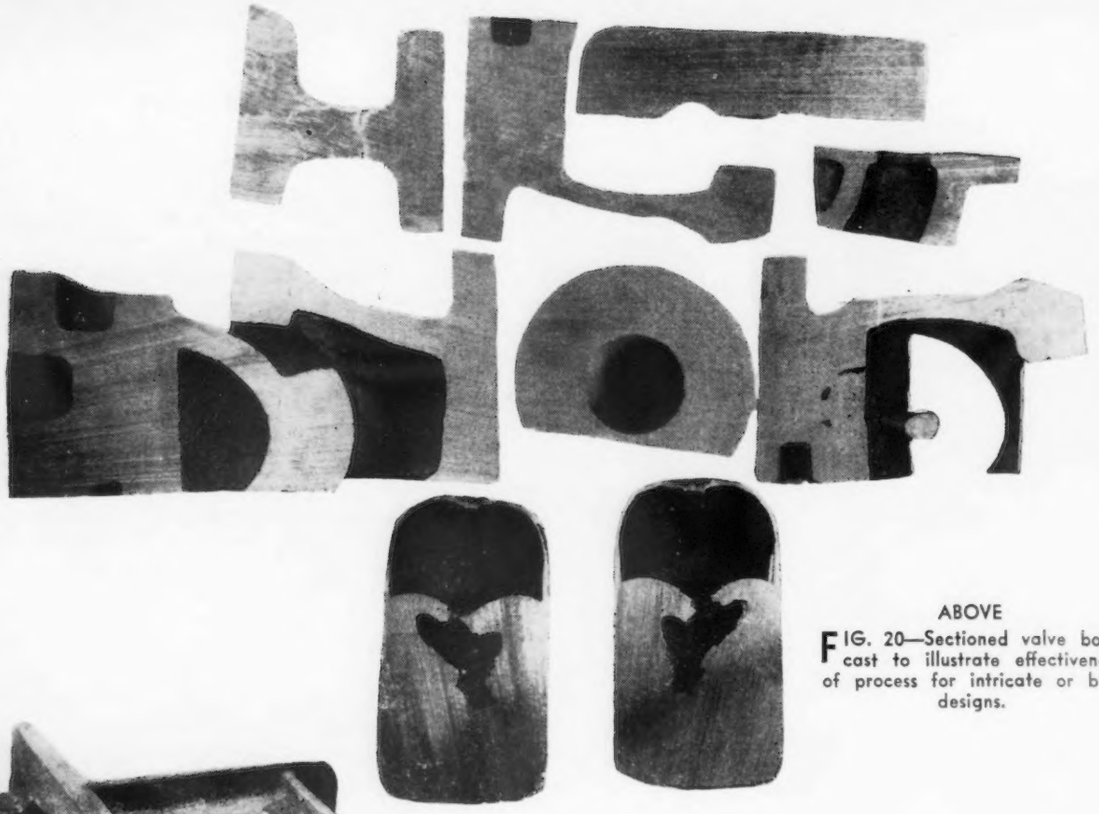
So that a control of gas pressure can be established a relation between gas evolution and the compound has been determined. It has not, so far as the authors are aware, been previously appreciated that liquid shrinkage is constantly tending to create a

yield was decreased to 70 pct, a sound casting was produced as shown in fig. 27D.

The same casting was made using the gas-pressure head, and a sound casting was produced (see fig. 37A) with a yield of 84.2 pct. Further sound castings were made by this method, but no effort was made to increase the yield by decreasing the head height, although it was generally felt this could have been made with consequent increase in yield.

The graph shown in fig. 28 shows the comparison between gravity, atmospheric and gas-pressure heads on 11 castings chosen at random where all three types of heads were investigated (proved sound by radiography or careful sectioning). In each case the object was to obtain sound castings. The difference can be seen between the atmospheric and gas-pressure head, but the most pronounced difference is between gas-pressure heads and normal gravity heads, is shown to be an average of 30 pct higher yield for the gas-pressure head.

FIG. 18—Sectioned head from gear case casting shown in Fig. 17.



ABOVE

FIG. 20—Sectioned valve body cast to illustrate effectiveness of process for intricate or bad designs.

LEFT

FIG. 19—This gear case casting was made with only two feeding heads, the center atmospheric head having been eliminated. This raised the yield from 80 pct to 87.1 pct.

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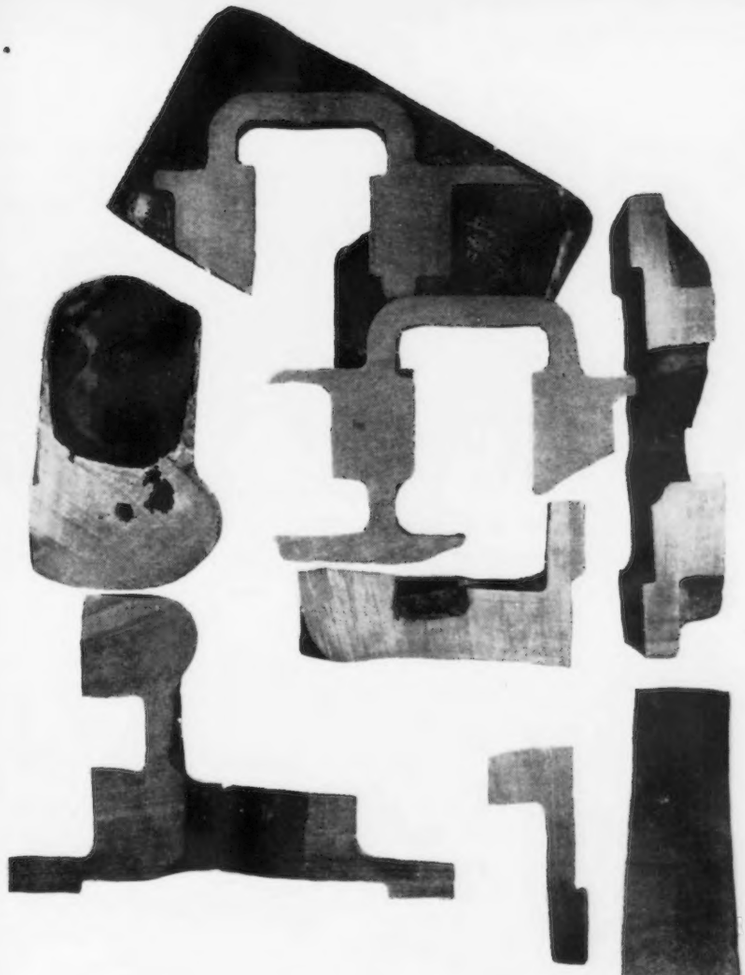
FIG. 21—The roller bracket was used because of the sudden changes in section occurring frequently throughout the casting. It was produced successfully with gas-pressure feeding with a yield of 76 pct.



LEFT

FIG. 22 — Sections of the roller bracket shown in Fig. 21 illustrates soundness of the casting.

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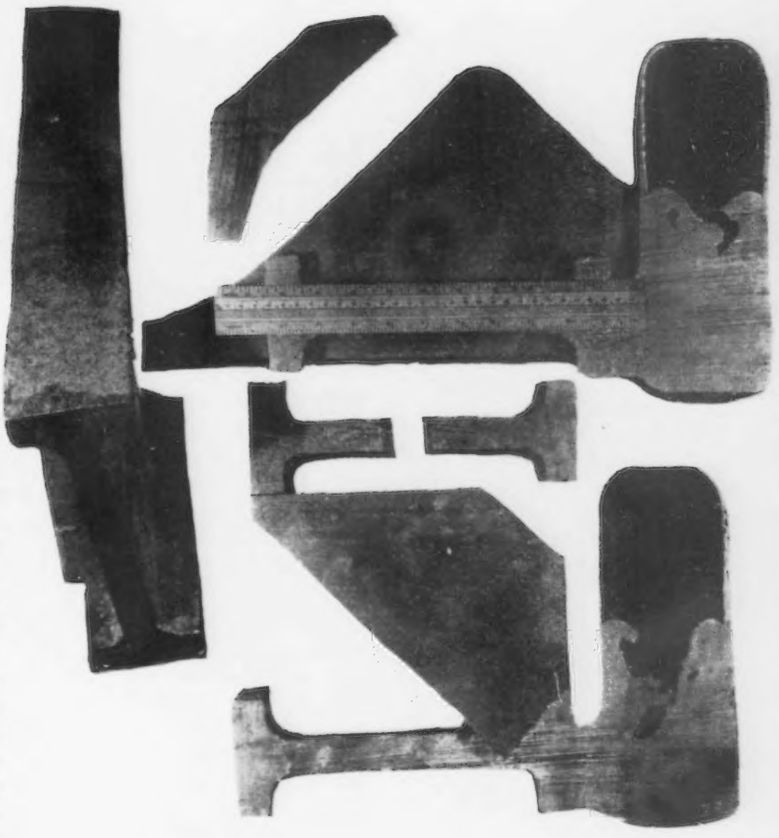
BELOW

FIG. 23—The girder casting, shown in sections here, weighed close to 300 lb and was successfully fed using only one gas-presure head. Practically the theoretical yield was obtained, namely 95.1 pct. A meniscus is clearly shown in the head.



partial vacuum in the casting. High gas pressure in the feeder head pushes the liquid metal from the head to the casting, preventing the formation of the vacuum. Each successive amount of shrinkage in the casting is compensated for by additional fluid metal forced in from the head due to this gas pressure. In addition the shape of the shrinkage cavity in the head irrespective of the casting temperature can be correlated with the applied pressure.

This development was introduced into the foundry with which the authors are connected and various castings were made. Sound castings were obtained with yields varying from 75 pct to 95 pct. With the same type of castings, yields of 60 pct using gravity feeding have been considered good in the past. Moreover, these gas-pressure yields are higher than other methods of castings (including centrifugal casting).

Conclusions

(1) In steel foundries using normal types of gravity feeding heads (with open tops or as blind heads) the normal yield, that is, yield of castings to liquid metal used, is in the order of 50 pct. If any higher average yield than this is obtained, it is generally at the expense of soundness in the castings. Admittedly for certain types of castings perfect soundness is not necessary to give reasonable performance in service. The inefficiency of the normal open topped head is due to quick freezing of the head. Thus the only pressure forcing the used metal into the casting to compensate for liquid shrinkage is that of gravity. Atmospheric pressure is only additionally exercised so long as the head is kept open to atmosphere.

(2) Research work in recent years on the feeding of steel castings has resulted in methods being developed which have resulted in the founder's ability to improve the yield or increase the soundness of the castings for the same yield. Notable among these improvements are what are known as

ABOVE

FIG. 24—This base bracket cast by gas-pressure feeding was used as a standard in comparing efficiencies of atmospheric and gas-pressure feeding.

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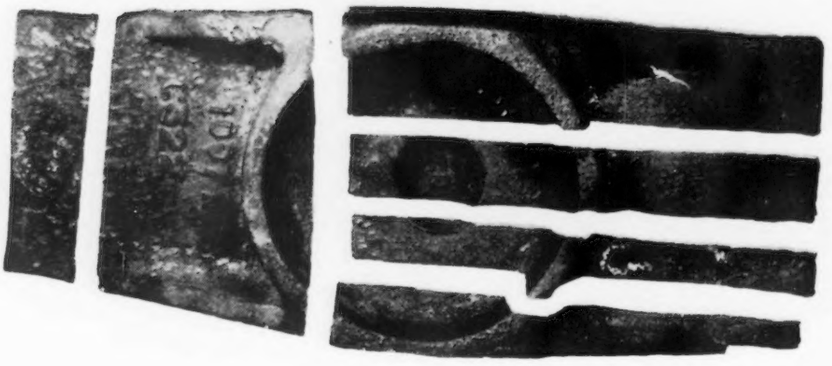
(3) None of the methods previously developed result in a yield approaching the theoretical possibility of about 90 pct. Centrifugal casting has previously most nearly approached this but the field for centrifugal casting is limited, equipment is expensive and the technique lengthy and expensive to acquire for differing types of castings.

(4) By studying the fundamental laws and requirements governing the production of castings with high yield, the method of feeding described in this paper has been discovered and developed.

BELOW

FIG. 25—Shown here are the planes along which all standard castings produced were sectioned.



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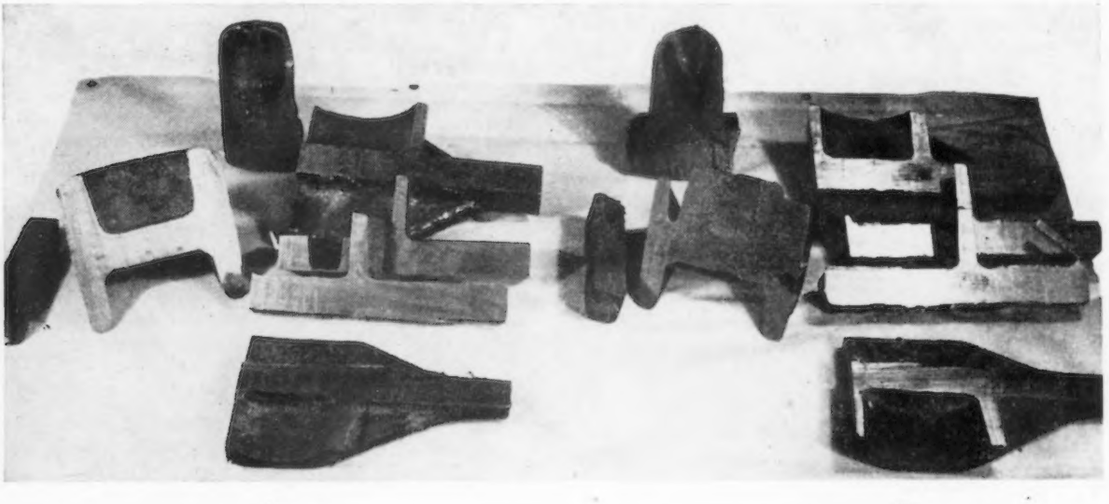
the "swirl gate head" (developed by Hopinsons and English Steel Corp. and the "atmospheric head" developed by Williams. Centrifugal casting with vertical axis machines utilizing centrifugal force to secure high liquid pressure to compensate for shrinkage has the same object in view; that is, securing a high yield with soundness.

This is capable of being easily used in foundries and gives high yields and sound castings. The paper shows also that the efficiency of feeding is proportional to the pressure applied to the head metal.

(5) This method (called for convenience the gas pressure head) achieves two main objects:

FIG. 26—(A) Sectional gas-pressure base bracket. Casting is sound; yield was 75.9 pct. (B) When cast with atmospheric pressure with a yield of 75 pct, casting was unsound.



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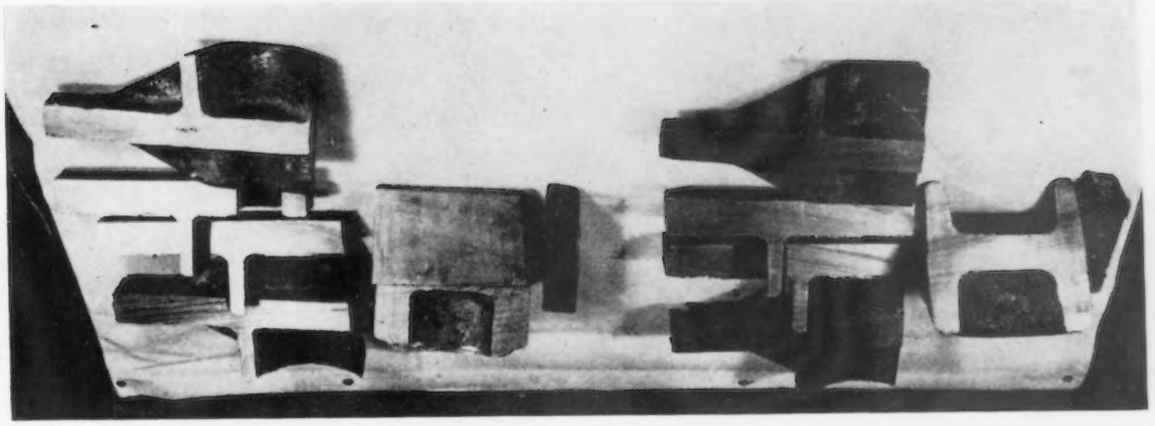

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FIG. 27—(C) Reducing yield to 73.2 pct still proved the atmospheric head insufficient to give absolute soundness. (D) When the yield was decreased to 70 pct, a sound casting was produced.

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a—Forces the head metal into the casting to compensate for liquid shrinkage at pressure hitherto quite unobtainable in practice.

b—Maintains the fluidity of the head for a sufficient length of time to enable a large proportion of the head metal to be effectively used.

(6) To produce sound castings free from shrinkage cavities previously the following weight of runner and head metal was needed on the average:

With normal gravity heads	100 pct of the weight of the casting
With atmospheric heads	60 pct of the weight of the casting
With vertical axis centrifugal casting	40 pct of the weight of the casting
With gas pressure heads	15 pct of the weight of the casting

(7) With gas-pressure heads, yields of 80 pct to 95 pct can be regularly obtained with full compensation for liquid shrinkage, that is, complete soundness. Thus the weight of runner and head metal needed is only 15 pct to 25 pct of the weight of the casting.

(8) Means of producing and controlling gas pressure in the heads have been determined as well as means of delaying the production of gas pressure until the head has formed a gas-tight skin and means of securing the production of additional heat as well as gas pressure.

(9) Experimental data and examples are given showing both the theoretical considerations underlying this method and the resultant development in practice. The method of feeding using gas pressure is used in conjunction with all other known laws governing feeding and can, therefore, be used to promote maximum efficiency in feeding. For example, promotion of directional solidification as is done also with the atmospheric and whirl-gate head.

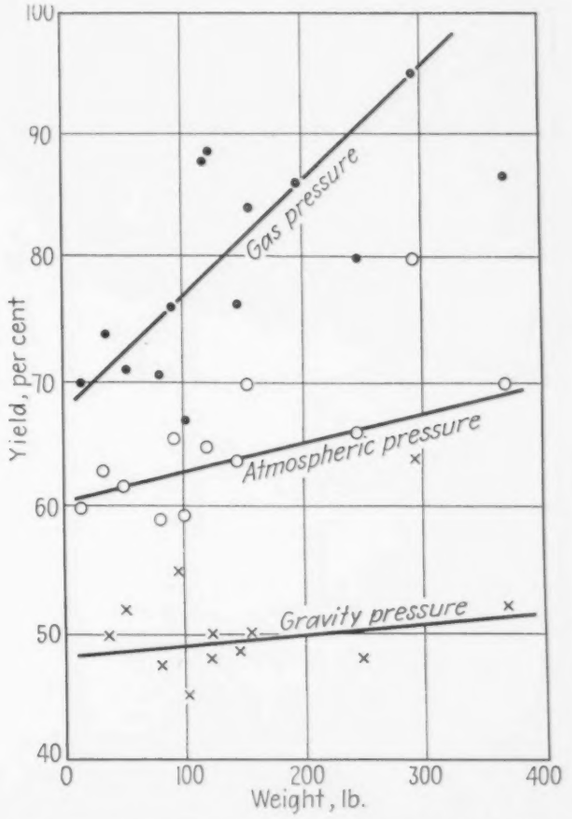

FIG. 28—Relation between weight of casting to yield in different feeding arrangement.

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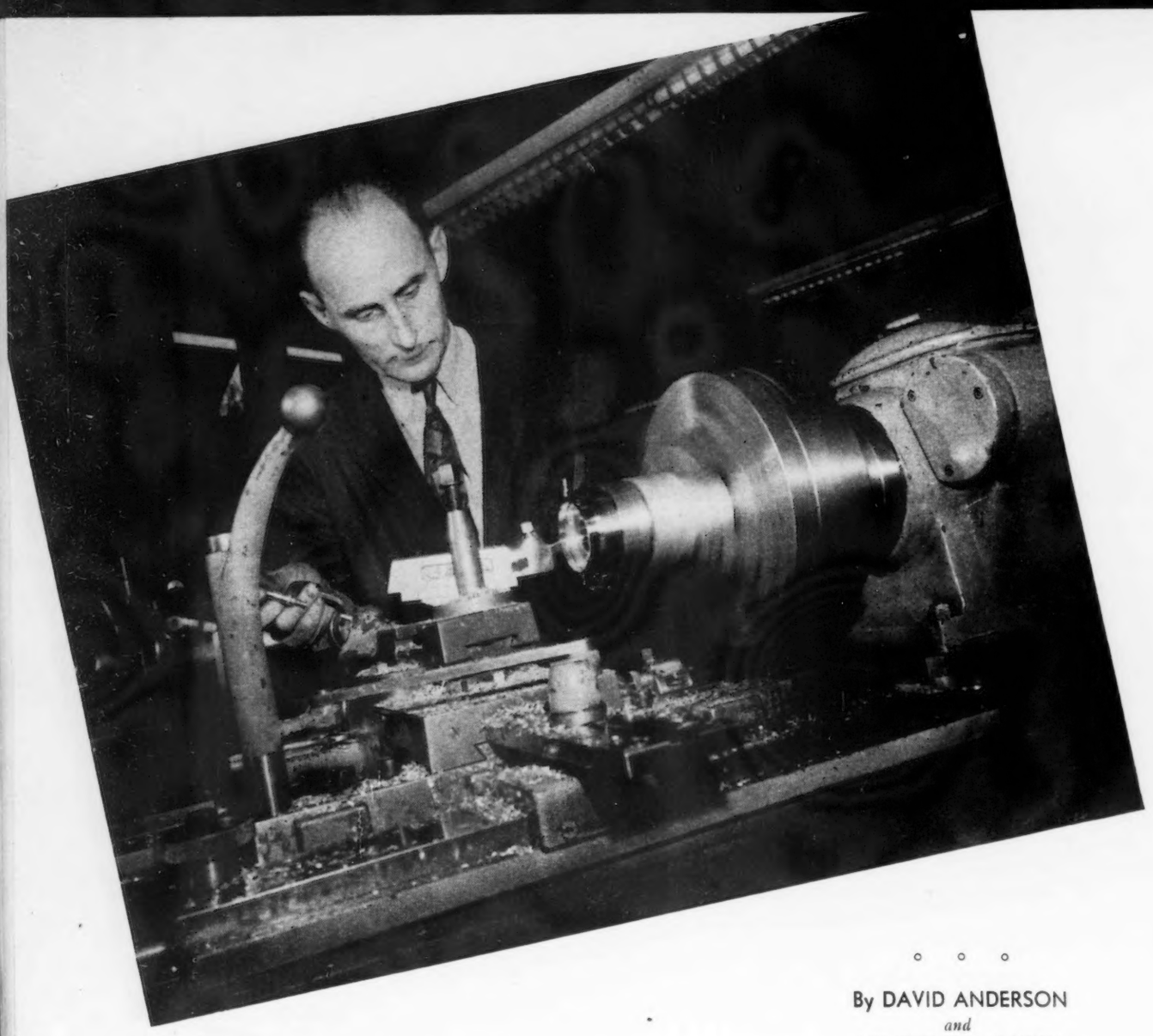
Acknowledgments

The authors are indebted to the managing director, F. W. Rowe, for his helpful criticism and encouragement, the work being carried out in the K & L research laboratories and foundry. Thanks are due to the foundry personnel for help in the productive application of this development. Finally, the authors record their sincere thanks to the directors of K & L Steelfounders & Engineers Ltd., for permission to publish information included in the paper.



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and
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IN evaluating any job there is one important fact which must constantly be borne in mind by the evaluator—that the evaluation is concerned only with those factors which are actually required by the job itself. The realization of this is of paramount importance if the results are to be reliable and consistent. It may often be found that an individual employee on a job may have particular qualifications which far exceed the demands of the job on which he has been assigned; or his qualifications may be of a different character from those called for by the work. However, these characteristics and qualifications cannot be considered in evaluating a job.

This should not be taken to mean that job evaluation and individual recognition are incompatible. On the contrary, through the establishment of standards of qualifications for each job, management is provided with a yardstick by which it can institute a program of systematized upgrading of employees whose merits or qualifications exceed those required by their current jobs.

The first step in an evaluation, and the most important one, is the determination of precisely what the work under consideration calls for and what it involves. If the evaluation is to have real value in any of the aspects of industrial relations, where it can make positive contributions to management, then the job description must be more than a general summary of the work being performed. Wherever possible, it is desirable that the work itself be observed. It must be a factual and detailed report covering every significant aspect of the job under study. It should be sufficiently detailed so that the entire job can be reconstructed and visualized from the job description. Very frequently when work is on standard, the time study will supply an exact description of the manner in which the job must be performed, and will supply accurate information as to the degree to which the work being observed places the employee under load. The job description, detailing the operation of a machine, or the making of a tool, is the basis of the entire program. From it, a job analysis into factors and point values is made. From it, personnel specifications may be written for every type of job in the factory. From it, the detailed information which is so essential to a thorough understanding of every job and to an orderly process of simplification and standardization may be obtained.

After the job description has been completed, the job should be examined and analyzed separately for each factor being evaluated. No attempt should be

Common Sense in Job Evaluation

made to evaluate more than one factor at a time. This is important in order to be certain that each factor is given individual attention and that the point value assigned is not based on any overall impression of the job but upon actual examination of the extent to which the job involves the presence of each factor. When the degree to which a factor is present on a job has been determined, the point range for the factor may be obtained from a scale of point values which has been prepared. The exact position of the job in the point range can be established by comparing the requirements of the job being evaluated with the requirements of the key jobs which should be established and listed with their point values on the scales.

Below will be found a detailed discussion of each of the factors to be measured, the point weights to be assigned for each degree to which a factor may be present, and the manner in which each factor may be applied to a job.

FACTOR NO. 1: MENTAL DEVELOPMENT—Mental development refers to those mental characteristics, such as the ability to understand problems and apply systematized reasoning to their solution, which are considered as being prerequisite to the capability of any employee to undertake a job successfully. It involves the capacity to handle problems at various levels of complexity, and use effectively those facilities such as language, mathematics, and the sciences, which are best suited to meet the demand of the work. This factor should not be confused with the requirements for specific knowledge of any field. It pertains rather to those mental attributes which are needed in order to be able to assimilate effectively and apply specific knowledge.

The factor of mental development is frequently measured in terms of an equivalent to some level of education because it is most frequently acquired through schooling. However, formal education is not necessarily essential to mental development.

This factor is often considered the most fundamental of all attributes, since it is basic to the acquisition of many forms of technical knowledge and to the exercise of sound judgment and initiative.

In examining work for determining the presence of this factor care should be taken that only those faculties called for by the work be considered.

FACTOR NO. 2: KNOWLEDGE—Knowledge is the measure of what an employee on a job must actually know in order to perform that job. It may be obtained from experience, from study, from schooling or from any other source; but from whatever source it is obtained, it is the know-how of successfully meeting the performance requirements of a job. As used here, knowledge refers primarily to the specific knowledge which is required by each particular type of work.

Measurement of the degree of knowledge which is required for the satisfactory performance of a job has frequently been referred to as experience or the length of time required by any employee to learn a job. It

. . . In the second part of this three-part article the requirements for assigning point values are set forth and five of the eleven job factors are individually considered.

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has been found however, that experience in terms of time is a purely subjective measurement and frequently various employees performing the same work will require different lengths of time in order to reach proficiency.

As a result, it is difficult to establish any really sound basis for actually determining the length of experience required by a job in terms of time. Therefore, in evaluating the factor of knowledge, experience required in terms of time is not considered.

There are three basic types of knowledge. These may be required on a job either separately or in combination. Since they are of varying degrees of com-

Factor No. 1
Scale for Mental Development
65 Points

	Level of Mental Development Required by Work	Point Range
(1)	Reading, writing and understanding simple instructions	1 to 2
(2)	Handling problems in simple arithmetic whole numbers (equivalent to 6th grade)	3 to 6
(3)	Handling problems in arithmetic fractions or decimals (equivalent to 8th grade)	7 to 11
(4)	Handling records, tabulations and simple charts; reading and writing with ease; understanding simple drawings, (equivalent to 2 yr high school)	12 to 20
(5)	Equivalent to handling computations such as in elementary algebra; understanding of basic principles of systematized reasoning and elementary sciences (equivalent to high school grad.)	21 to 30
(6)	Equivalent to handling fairly difficult problems in mathematics; ability to visualize problems on fairly high level of abstraction; familiarity with scientific methods (equivalent to 2 yrs college)	31 to 40
(7)	Equivalent to analyzing difficult technical processes and procedures; developing new controls, procedures; solving complex problems; planning independently to attain specified goals (equivalent to college graduate)	41 to 50
(8)	Equivalent to handling problems in advanced science and mathematics; institution of engineering or professional analysis and research	51 to 60
(9)	Equivalent to handling most difficult types of problems in the fields of research and development; solving difficult technical problems where minimum of precedent is available	61 to 65

Factor No. 2A
Scale for Knowledge
Knowledge of Methods, Procedures & Processes
55 Points

Methods	Degree of Knowledge		
	Casual	Working	Expert
Simple Methods: (Routine operation, single element, repetitive work, generally of short cycle)	1 to 3	4 to 8	9 to 15
Average Methods: (Multiple element, long/short cycle work difficult processes or operations)	4 to 7	8 to 18	16 to 35
Complex Methods: (Multiple element, special processes, complex work to close tolerances)	6 to 12	13 to 35	36 to 55

plexity and of value, each type of knowledge is measured separately. These types are:

(1) Knowledge of methods, procedures, techniques, and processes.
(2) Knowledge of materials.
(3) Knowledge of tools and equipment.

In analyzing the several types of work performed in a factory, it will generally be found that the knowledge requirements for various types of work will fall into three categories in different proportions. Thus the work of a machinist will generally require an expert knowledge of tools and equipment, a working knowledge of methods and processes, and only a casual knowledge of materials. That of a metallurgist, on the other hand, will require an expert knowledge of materials, a working knowledge of tools and equipment, and a working or casual knowledge of shop methods and processes.

Factor No. 2B
Knowledge of Materials
40 Points

Type of Material	Type of Knowledge		
	Casual	Working	Expert
A few common materials: (steel, brass, copper)	1 to 3	4 to 6	7 to 10
Wide variety of types of common materials: (hard-woods, soft-woods, tool steels, brass, etc.)	4 to 6	7 to 10	11 to 25
Wide variety of uncommon materials: (special metals, chemicals, dyes, agents)	7 to 10	11 to 20	21 to 40

Since the factor of knowledge has been divided into the three basic types — material, equipment and process—it should be a relatively simple matter to classify accurately each type of knowledge required by a job and to evaluate accurately the degree to which it is demanded. In each plant, of course, the terms identifying the several degrees of knowledge should be clearly defined. Once this is done there should be no difficulty in consistently evaluating any degree or type of knowledge demanded by any job.

FACTOR NO. 3: JUDGMENT AND INITIATIVE—Some jobs involve only the performance of simple standardized repetitive work. Others involve work requiring the constant exercise of judgment on the part of the employee. Such work may require the employee to evaluate quality and to exercise sound judgment in making decisions; or it may involve the responsibility for determining basic departmental or plant policy; or it may require the examination of poor processing results and call for a decision as to the nature of the best corrective action and how it may best be achieved.

Judgment involves the ability to analyze, weigh, understand and plan courses of action. The degree to which judgment is required on any job depends on the nature of the decisions to be made and on the extent to which policy and precedent is available to guide the employee in arriving at a decision.

Factor No. 2C
Knowledge of Tools & Equipment
35 Points

Types of Tools and Equipment	Degree of Knowledge Required		
	Casual	Working	Expert
Average machines and simple hand tools: (plug, and ring gage, burring tools, power press, drill press, turning machines	1 to 2	3 to 6	7 to 12
Complex machines and difficult hand tools: (Lathes, milling machines, tool grinders)	3 to 5	6 to 12	13 to 25
Very complex machines: (Automatic screw machines, complex electrical equipment)	6 to 10	11 to 25	26 to 35

Initiative involves those job requirements which necessitate the employees taking action in the carrying out of decisions. It involves the qualities of resourcefulness, ingenuity and the ability to act. The degree to which it is required depends on the nature of the action to be taken as well as the presence of precedent.

The requirement for judgment on any job may exist independently of the requirements for initiative. For example, an inspector might be called upon to exercise good judgment in evaluating quality. However, this would not necessarily involve the presence of initiative. The exercise of initiative in carrying out decisions generally calls for the use of sound judgment.

FACTOR NO. 4: PHYSICAL SKILL—The factor of physical skill refers to those requirements on a job which demand the acquisition and application by the employee of physical technique. In production work, this may cover such performance factors as sensitivity of touch and feel, muscular coordination, the development of rhythm and automaticity, and the development of complex motion patterns calling for extensive synchronization of eyes, hands, and other parts of the body.

Physical skill is essentially comprised of two basic components: the requirement for accuracy and the need for dexterity, or muscular coordination.

The requirement for accuracy on any job is dependent on the degree of exactness or accuracy with which it is necessary to work. Accuracy in job evaluation is not measured by the tolerances on the parts produced, but the extent to which the accuracy required is dependent on the physical control of the operator. Frequently jobs involving close tolerances require little accuracy from the operator. The required accuracy is often built into the machine or tool being used for the job. On the other hand, some jobs specifying comparatively loose limits may require a high degree of control from the operator for satisfactory completion. For example, a carpenter using a hand scale may require greater control in order to measure within the limits of 0.01 in. than an operator using a micrometer and measuring within limits of 0.001 in.

The amount of dexterity needed for a job is generally determined by the complexity and delicacy of the motions required, the degree of muscular coordination involving synchronization of the various parts of the body, and the extent to which complex rhythms may have to be acquired. The degree to which repetition is present on a job will also influence the amount of dexterity required by the operator. The greater the amount of repetition on a job, the greater will be the opportunities available for development of automaticity through habit pattern. This will, of course, tend to reduce the dexterity needed, since once a habit pattern is acquired on a highly repetitive task, the motion sequence and application of technique becomes essentially automatic.

In evaluating this factor, it should be remembered that it is often possible for a job to require a high degree of dexterity, in terms of carefully controlled deli-

Factor No. 3
Scale for Judgment & Initiative
60 Points

Judgment	Initiative		
	Little or None	Moderate Initiative Required	Ext. Initiative Required
Simple decisions: (Decisions involving only routine alternatives)	1 to 5	6 to 15	16 to 25
Ordinary decisions: (Decisions based on precedent but involving several factors or alternatives)	6 to 15	16 to 25	26 to 35
Difficult decisions: (Decisions involving important consequences with no standards or precedents)	16 to 25	26 to 35	36 to 60

Factor No. 4
Scale for Physical Skill
45 Points

Degree of Skill	Accuracy		
	Easy Limits	Average Limits	Close Limits
Little: (Simple motions and rhythm; little coordination)	1 to 2	3 to 8	9 to 15
Average: (Acquired motion patterns involving some muscular coordination and synchronization)	3 to 6	7 to 15	16 to 25
Above Average: (Difficult motion patterns involving muscular control synchronization, sensitivity of touch, high degree of coordination)	7 to 12	13 to 22	23 to 32
Exceptional: (Complex motion patterns, minimum of repetition; high degree of muscular control and sensitivity; delicate movements, integration of many difficult and varied elements)	13 to 20	21 to 32	33 to 45

In evaluating this factor, it should be remembered that it is often possible for a job to require a high degree of dexterity, in terms of carefully controlled deli-

Factor No. 5
Scale for Mental & Visual Demand
40 Points

Continuity of Exertion	Degree of Exertion		
	Slight	Moderate	Intense
Seldom: (less than 20 pct of total time)	1 to 2	3 to 4	5 to 9
Occasional: (21 pct to 44 pct of total time)	3 to 4	5 to 9	10 to 18
Frequent: (45 pct to 69 pct of total time)	5 to 7	8 to 18	19 to 25
Constant: (70 pct or more of total time)	7 to 8	9 to 25	26 to 40

cate muscular action and coordination, but little precision. While the converse may also be true of precision, it is more generally found that where a job calls for high precision from the operator, it will usually also demand a substantial degree of dexterity in order to obtain the precision required.

FACTOR NO. 5: MENTAL AND VISUAL DEMAND—This factor measures the degree of attention and concentration which a job demands from an employee.

The requirements of any job in terms of mental and visual demand are comprised of two factors: the intensity of the concentration and attention involved on a job and the continuity with which the effort must be maintained. For example, on many machine operations where the work involves waiting for a machine or process to complete its cycle, or mental or visual inspection operations, where a qualitative evaluation of the work being inspected is needed, continuous concentration and visual attention at a high degree of intensity is often demanded of the employee.

For the purpose of job evaluation the following subdivisions are generally made in determining the continuity of the effort involved in performing the job:

(1) Where the mental and visual attention is sustained for less than 20 pct of the total time, it is considered as merely seldom.

(2) Where it is sustained for 21 pct to 44 pct of the time, it is considered occasional.

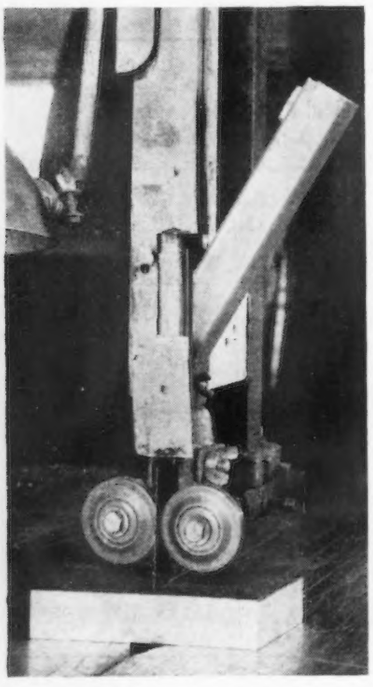
(3) Where it is sustained for 45 pct to 69 pct of the time, it is considered frequent.

(4) Where it is sustained for 70 pct or more of the total time, it is considered as being continuous.

New Saw Lubricant

METAL band saw blades can be used three times as long when lubricated with a new product, known as Elf saw lubricator, which was developed at Consolidated Vultee's San Diego plant. Automatic application of the lubricating compound to the blade is possible by attaching a device invented by E. L. Flood.

The new compound is dry lubricant containing turpentine, mineral oil, wax and other materials. Tests of the saw lubricant at Convair's plant revealed that a Yates-American saw equipped with a 1-in. blade used only 3 blades during an 8-hr day compared to 10 blades a day before the lubricant was applied. It was found that on inside cuts without lubrication, blades could normally be welded only twice due to the metal becoming work-hardened. When the lubricator was used, three to four times as many welds could be made on the blade.



Another test was made on a large DoAll Metalmaster, using two ⅜ 10-point saws, one with Elf lubricator, and the other without. A uniform pressure of 25 lb was applied and the saw speed was 150 fpm. Metals sawed included cold rolled steel, hot rolled steel, Diamond 2 steel and Eclipse steel. Thicknesses of pieces cut varied from 1 in. to 4½ in. The saw which was lubricated cut 488 in. in 628 min, or an average of ¾ in. per min. The saw without lubrication cut 382 in. in 722 min, or slightly more than half an inch per minute. Only slight wear occurred on the lubricated saw, while the blade without lubrication had run to destruction.

An important advantage of the dry lubricant over liquid coolants is that it does not cause the make-up dye to run on the surface of the work, thereby defacing the markings and making identification difficult for cutting. Liquids also spread over the work and result in an accumulation of shavings and dust on the surface of the work. Wax lubricants and graphite types were found inferior in tests conducted by Convair.

The device for providing automatic lubrication consists of a square metal holder which comes in ½-in. and 1-in. sizes, with a slot running lengthwise. The base of the holder is attached to the saw frame. The slot guides a small weight which rests on top of the stick of lubricant and thus provides continuous application to the saw blade. The lubricant passes between the teeth to the inside surface, assuring adequate lubrication on both sides.

For high speed dural sawing, or when making contour cuts, direct application of the product to both sides of the blade is recommended.

Elf lubricator is available in package form for application by the operator, or in square sticks for automatic use. The product is manufactured by Aviation Lubricants Co., and is being distributed by Monogram Manufacturing Co., Los Angeles.

Single-Point Turning Research

The number of combinations of variables which may occur when evaluating cutter performance amounts to 165,888,000, considering only the major factors. Last week the experimental equipment was described and in this, the second section of a two-part article, further details are given of the special equipment used in the tests, and reasons are given for undertaking the research.

o o o

By JOSEPH F. ALLEN
Project Engineer,
Warner & Swasey Co., Cleveland

o o o

THE results of calibration for the tangential or main cutting force are shown in Fig. 7. The small hysteresis loop 1-2-3-4 shows pressure vs meter reading for a load which oscillates between 450 and 500 lb, and similar loops are shown at other pressures. Such a variation would represent a poor cutter, and a line E-F drawn through the centers of these loops could be used for poor cutters. The line C-D indicates a decreasing load from 950 lb max, and the line A-B indicates a steady increase from zero and represents an ideal cutter operating without vibration. A line drawn halfway between the ideal and the poor cutter lines was selected as the curve to be used as representing an average cutter. At 500-lb force, the maximum probable error resulting from the use of this curve amounts to ±2½ pct.

The test logs to be cut are 24-in. long by 4¼-in. diam. It is planned to cut alloy steels down to 2½-in. diam in the annealed condition and then to heat treat the 2½-in. diam bars to various degrees of hardness for further cutting tests. On mild steel the logs are cut down to 1-in. diam and then discarded. The test logs are gripped in a three-jaw chuck and supported at the other end on a live center.

In removing metal by single-point turning, the rate of metal removal will vary for different diameters, even though the surface feet per minute and depth of cut are held constant. For instance, with a 0.125-in. depth of cut and 0.015-in. feed per revolution and a surface cutting speed of 1000 fpm, the rate of metal removal at 4¼-in. OD is 21.8 cubic inches per minute, whereas at 1½-in. OD it is only 20.6 cu in. per min.

Micrometers are used to measure the work diameter before and after each cut. Cutting speed is first set to the desired value as indicated on the cutting speed meter, and is then checked with an accurate surface speed indicator held against the rotating log.

In order to facilitate computation, tables were constructed around a basic cutting speed of 1000 sfm and 0.125-in. depth of cut and 0.015-in. feed to yield the rate of metal removal for any of the diameters used and with corrections for deviation from basic speed or depth of cut. Tables were also constructed to yield hp at the cut for any value of tangential cutting force observed and with corrections for deviation from basic speed. Computed values are quickly found from these tables which are accurate within 1 pct of observed data.

When taking a high speed cut on a small-diameter bar, the total time for traveling the length of cut

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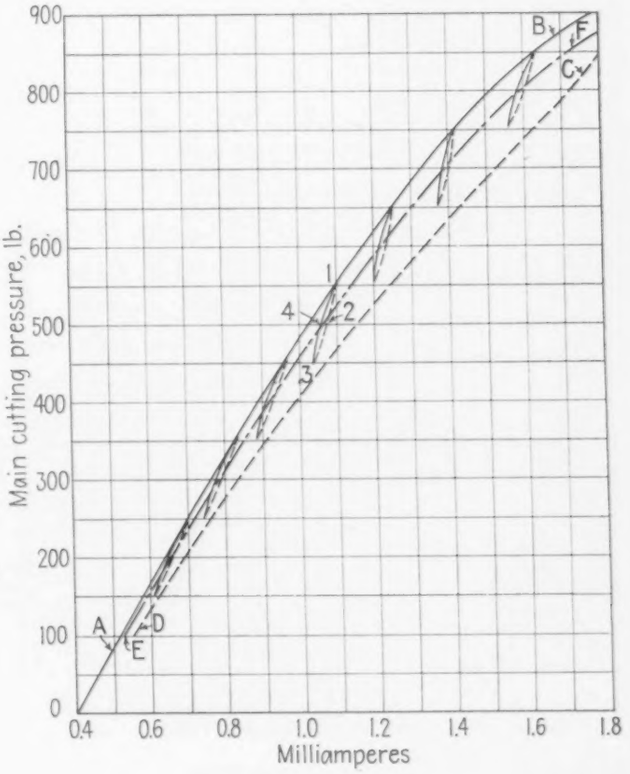
FIG. 7—Hysteresis curves for main cutting pressure. The curve used for the cutting tests is the average between lines A-B and E-F which would have a maximum probable error of ± 2½ pct.



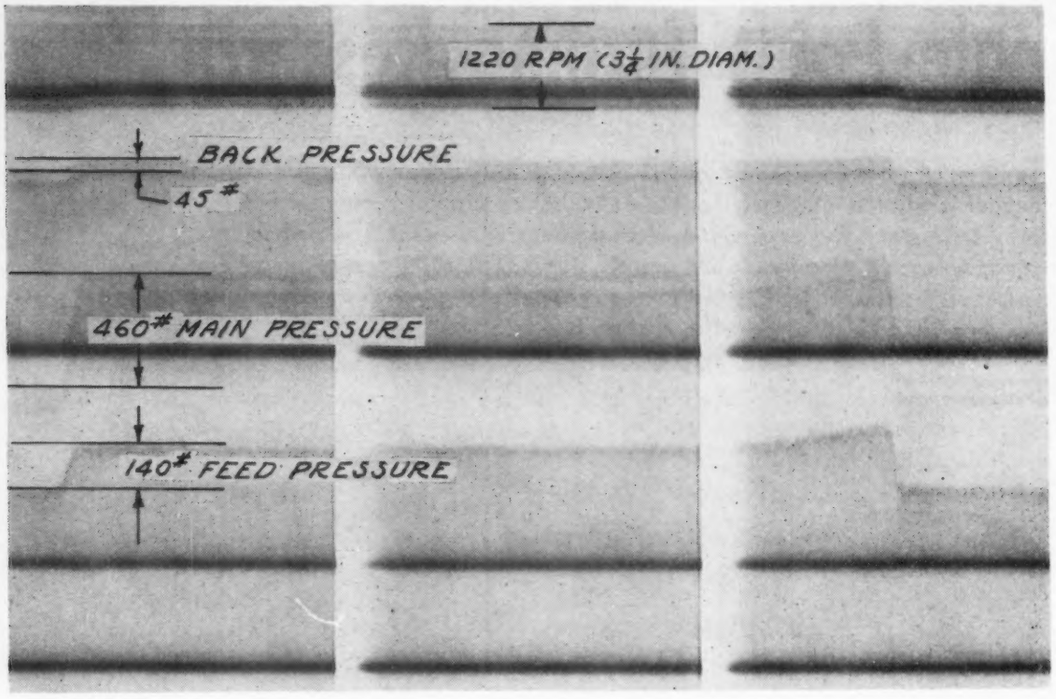


FIG. 8—Sample of the oscillograph record of a cut made with a new tool showing three 2-sec exposures. Note the rise in pressure just prior to the end of the cut, caused by chips forced against a shoulder on the work.

may be as little as 20 sec. It requires a rapid manipulation of switches and quick reading of the meters to get the data down in this short time. Furthermore, the meters can only be read once, and changing conditions at the cut go unnoticed. Automatic recording is not only desirable but has proved necessary on many occasions.

TABLE I

Items Which Determine Cutter Shape

Back-rake angle	Positive—Small Large Zero Negative—Small Large
Side-rake angle	Positive—Small Large Zero Negative—Small Large
Side-relief angle	Slight Moderate
End-relief angle	Slight Moderate
End-cutting edge angle	Small Large
Side-cutting edge angle	Zero Small Large
Nose	Sharp point Small chamfer Large chamfer Small radius Large radius
Chip breaker	None Land and groove type Parallel-step type Angular-step type

12,000 POSSIBLE COMBINATIONS

The mechanism used for this purpose contains a timing circuit which may be adjusted to give any desired length of exposure on the oscillograph photographic recording paper. The paper drive pulley is driven continuously, but the photographic paper is run past the light beam aperture for exposure only when the clutch is engaged. As the clutch engages, the light source within the oscillograph is switched on simultaneously and a record is made until the clutch disengages and the light goes off. A tube carrying adjustable screws is attached to the lathe carriage, and travels with it as the cut progresses. At the desired moment, these screws contact a limit switch, energizing the timing relay and breaking the circuit after whatever length of time has been chosen.

Fig. 8 shows a sample record. Length of exposure was about 2 sec, and three exposures are shown. The paper was traveling at a speed of 6 fpm. A record was taken at the beginning, in the middle, and at the end of the cut.

This record was made by a new cutter, and the action is quite smooth. The rise in pressure just prior to the end of the cut is an example of the type of behavior that would have escaped detection except through the use of an oscillograph and a force measuring instrument. This rise in pressure was due to action of the chips against the shoulder left by the previous cut.

This cut was taken at 1000 fpm; the depth of cut was ⅛ in. and the feed was 0.015-in. per revolution. The material cut was SAE 1020 hot-rolled steel.

Fig. 9 shows a record made by the same cutter after it had become dull. The roughness is in contrast to the smooth record made by the cutter when it was new, and the forces have increased.

This concludes the description of equipment and instruments used, except to mention that the tips of

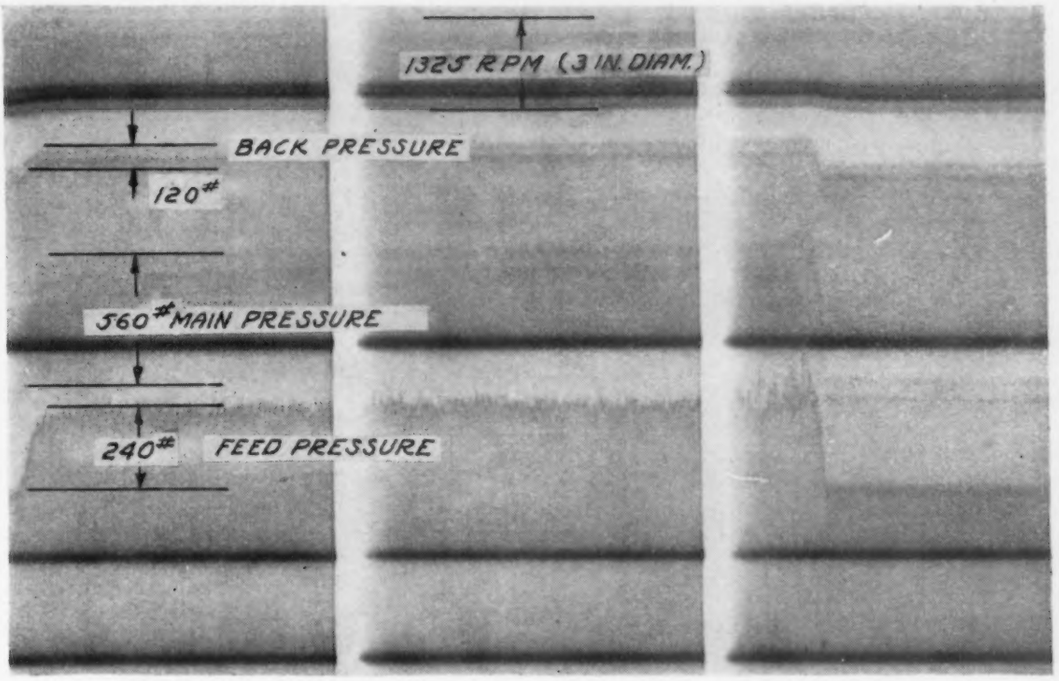


FIG. 9 — Oscillograph record made by the same tool as in fig. 8 after it had become dull. The roughness is in sharp contrast with the previous record, and pressures have increased materially.

the cutters are photographed at regular intervals at a magnification of eight times on a 5 x 7 camera equipped with a 48 mm Micro-Tessar Lens. The cutter tips are examined frequently under a binocular microscope. Edge abrasion and cracks or chips can be measured to 0.0005 in. with a Filar micrometer eye piece attachment. The cutters are rough ground on silicon carbide wheels and finished on diamond wheels. Chip breaker grooves are ground in with diamond wheels, and the carbide tips are torch brazed with the utmost care to prevent cracking.

Many Variables Require Control

The choice of a program of metal-cutting research involves the consideration of a tremendous number of variables which must be as closely controlled as possible. Of all the persons whose interest has been stimulated in the past few years by the numerous discussions on metal cutting, there probably are not more than a few who fully appreciate the complexity of the subject.

To partially illustrate how involved a program of metal cutting research might become, refer to Table I. In the left column is a list of items which are required to describe a cutter shape, and to the right are shown possible variations of each item. These variations are the minimum number which can be considered. In the case of back rake, for example, the variations of which are shown as positive, zero, and negative, these could easily be increased to include further variations such as 3° negative, 6° negative, 10° negative, etc. Even with this scant list of variations, the total possible number of combinations of cutter shapes comes to 12,000. Further variables which must be considered are shown in Table II.

Table III shows a summary of the variables described, in which the total number of combinations amounts to 165,888,000; the number of cuts which must be taken to cover all of the possibilities described. This number accounts for one cut only for each combination. Unfortunately, the erratic nature of cutter behavior requires many cuts under one set of conditions before an average can be found that has any meaning. Furthermore, this number does not include consideration of cutting compounds, nor the effect of cross section of the cutter shank, nor rigidity of cutter mounting, nor adjustment of spindle bearings, nor the effect of height of cutter above and below the centerline of the spindle. The inclusion of these factors would cause the total possible combinations to skyrocket further into astronomical figures.

Faced with the gigantic proportions of the metal

TABLE II

Cutting Speed, Feed, and Depth of Cut

Cutting speed	Slow Medium Fast	27 combinations possible 18 combinations by selection
Depth of cut	Light Medium Heavy	
Feed	Light Medium Heavy	

Grades of Carbide

Three grades each of four different brands = 12 carbide materials

Cutter Treatment

Tip	Tip finish	Cutting Edge
brazed on clamped on	extremely smooth moderately smooth	honed off not honed off

8 COMBINATIONS

Material Cut

Assume eight, including various heat treatment of alloy steel

cutting process in all of its phases, it is compulsory that any one metal cutting research program be confined to a relatively narrow field of endeavor. The particular field chosen, of course, will be that which seems to offer the best possibilities for obtaining an answer to a particular problem, which in the case of this particular research program is to determine how much power is required and how fast metal can be removed when carbide cutters are operated under conditions that can be closely controlled. It is also desired to determine just what constitutes a set of ideal conditions and the extent to which development must be carried to provide these conditions in the standard machine tool.

Two courses of action have been selected as a starting point. The first of these is to determine the effect of cutter shape on the cutting force components, its effect on power required, and its effect on cutter life and workpiece finish. For this phase of the program all conditions of speed, feed, depth of cut, material cut and carbide used are held as nearly constant as is feasible.

The second course of action will be the investigation of the relative merits of the various grades of carbides available. For this phase also, all conditions are to be constant except the carbide used. Special effort is being directed to the successful heavy-duty application of the so-called harder carbides which up to now have been recommended only for light, high-speed finishing cuts.

Beyond these two steps, the course is not too clear except that an enormous number of feed-and-speed combinations must be included and many different materials must be cut. The exact direction of effort will depend largely upon the findings of previous steps taken.

Thus far the following conclusions have been reached:

(1) The impact of improved cutter performance on machine tool design is modified by other factors involved.

(2) Although its immediate influence may be relatively slight in some cases, nevertheless, improved cutter performance eventually dominates all other factors involved in the design of a machine tool.

(3) Therefore, the machine tool builder must keep himself informed on improvements in cutter performance and plan for utilization of these improvements through design development.

(4) Observation of advanced cutter usage will reveal the trend.

(5) However, exact determination of latent cutter potentialities can be made only through research.

(6) Effective research can be conducted only with the aid of proper equipment.

(7) It is believed that the construction of the facilities described in the foregoing pages has made available an effective means of reaching beyond the limitations of present standard equipment.

(8) The complexity of the problem of metal cutting research makes it necessary to choose a course of action which is relatively narrow in its scope.

[Further discussion of the work done and of the results obtained will be given in another article to appear at a later date. —Ed.]

TABLE III

Summary of Variables Involved in Metal-Cutting Research Program

Combinations of cutter shape	12,000
Combinations of speed, feed, and depth of cut	18
Grades of carbide to be used	12
Combinations of cutter treatment	8
Kinds of material to be cut	8

Total combinations involved equal product of these.
12,000 x 18 x 12 x 8 x 8 = 165,888,000 Combinations.

o o o

UP-ENDER

LIFTING drums on end was a back-breaking job for men at this loading dock until this homemade device was installed. Now, the drums, weighing a half-ton, are rolled to the air lift, air pressure is applied and the drum pops up like a match stick. An old double-acting cylinder type of air hoist and a three-way valve were used to make the man-saver.

Photo Courtesy Compressed Air Institute

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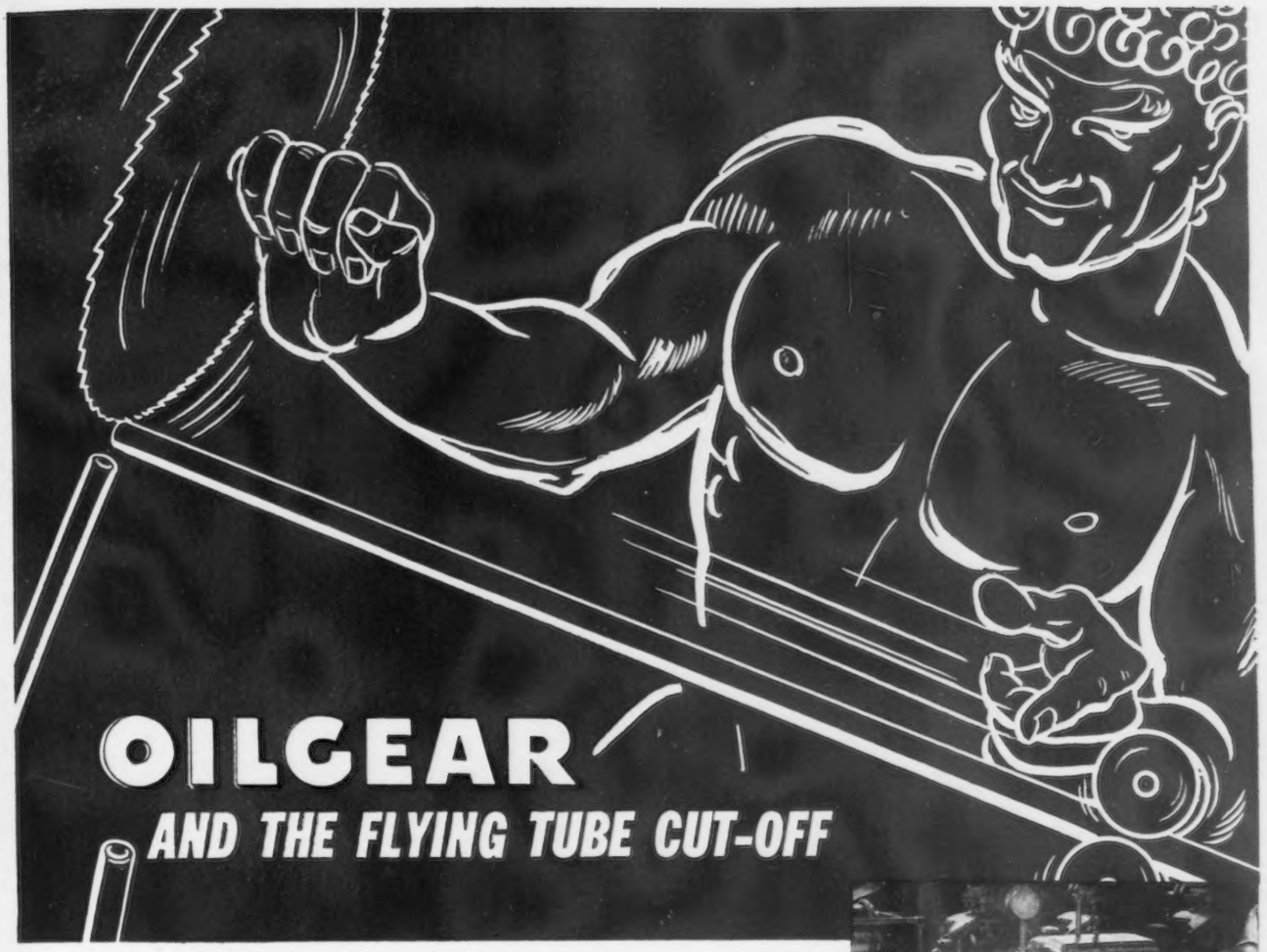

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Then a second, smaller carriage hurries in the opposite direction to measure off the length of tube to be cut—16 to 45 feet plus or minus 1/32"—; reverses instantaneously into step with tube speed, clamps the tube and glides with it during the cut-off.

The rotary cut-off slices through the tube which never abates its movement. The cut-off tool retreats, the auxiliary carriage unclamps the tube, and both auxiliary and main carriages race back to their original position ready for a new operation on the relentlessly advancing tube.

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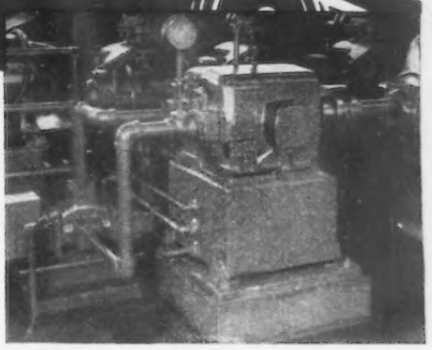

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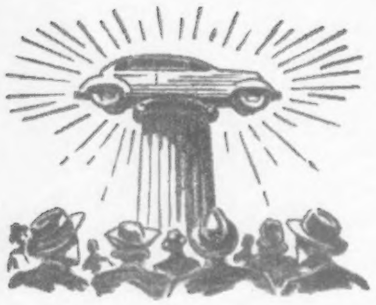


DETROIT — One thing about the Kaiser-Frazer Corp., it stays in the papers just as much as the auto industry's labor troubles. This past week saw Henry J. Kaiser come to town and, with Joseph Washington Frazer, proceed to unveil the new Kaiser, tell the story of how it was born and why, sign a new bargaining contract with the CIO United Auto Workers Union, inspect Willow Run and the engineering work on both the Kaiser and Frazer cars, and reap a publicity landslide.

The Kaiser is definitely an interesting vehicle. Built from the ground up, it embodies a number of innovations which already are undergoing the close scrutiny of automotive competition and will doubtless be a factor in forthcoming thinking. Already it is rather evident that the use of room formerly lost to fenders and to the open lengthwide space between fenders will be utilized for added seating room in a number of models besides the pioneering Kaiser and Frazer cars.

The width of the body, the same for both cars, is definitely the most intriguing feature in a number of them worked out in excellent fashion by the Detroit engineering firm of John A. Maxwell & Associates. The front seat, when finally cushioned (not one complete car exists today) will likely be somewhere around 66 in. wide, at least 6 in. more than conventional, with a hipline dimension somewhere around 72 in., achieved by the outward swell of the body as it extends toward the ground. The floor panel sheet itself is 6 ft across its widest point. Because the body sweep is only an inch or so as it runs from its widest point toward the rear, adequate seating for four persons in the rear is promised.

The width, naturally enough, may create problems. The driver's vision over the hood toward the curb may be affected by the width of the broad hood bonnet. The aerodynamic characteristics on cross-wind travel remain to be seen.

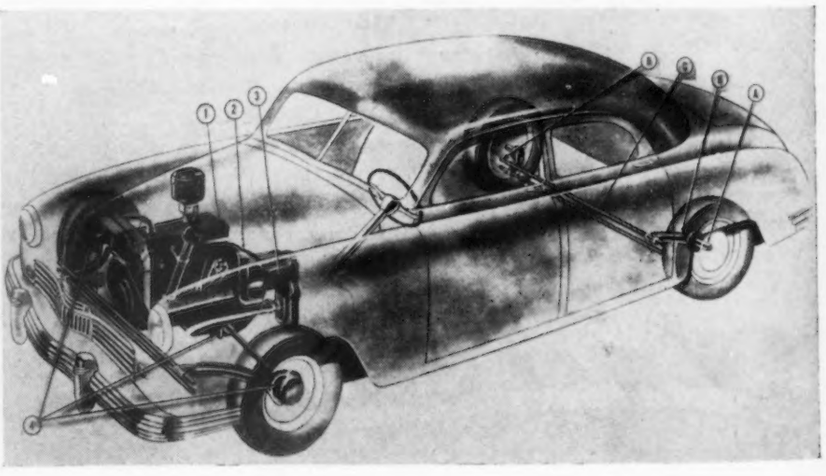
Those are largely design innovations. In the actual product engineering of the Kaiser-Frazer body, the Maxwell people have undertaken some interesting experimental work. For one thing, they have reduced the number of stampings in the body to about 250, far less than customary. This may prove entirely worthwhile. It may not. The acid test, naturally enough, will come when the body is put into production at Willow Run and count is taken on hours of work input. But there is radiating confidence at the Maxwell establishment that some most remarkable manufacturing economies will be produced.

IN achieving this reduction in the number of component pieces, the designers have utilized all the available advanced innovations, plus some of their own. The rear wheel well is typical. Modeled somewhat after the thinking which brought forth the Packard Clipper, this well is a boxlike structure which makes up into one structural unit enclosing the top half of the wheel front and back, inside and out. In producing this piece as one welded assembly, structural strength has been added to the whole.

The chassis has been brought back and the body moved forward. Just how the driver will be seated in relation to the windshields awaits the installation of interior fittings, but the front side post of the windshield (itself 4 in. wider than average) is about 6 in. closer to the driver than customary, enhancing his sweep of vision and increasing his visibility considerably.

Throughout, the body makes considerable use of 16 gage tubular sections rather than heavier metal, and thereby reduces weight. The white metal of the front seat as-

UNDER THE HOOD: *This phantom view of the new Kaiser car graphically shows its several mechanical innovations. Engine* (1), *clutch* (2), *transmission* (3) *and final drive assembly* (4) *are combined in a single unit which can be lifted clear of the integral body and frame for easy servicing. Torsionetic suspension provides independent springing for each wheel through spindle* (*A*) *supporting arm* (*B*) *and torsion-bar spring* (*C*) *anchored at* (*D*), *with springing effect achieved through the twisting action of the steel bar.*



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Accuracy

sembly, as example, weighs around 35 lb, lower than customary. Ample ribbing lends stiffness to these rather light stamped sections.

The one piece front fender ends at its rear in a boxlike inner section in which is hung the hood. The hanging of the hood differs from more typical hinging against the cowl, and, once more, is a reason why the driving experience of the cars will be carefully watched.

FIRST POSTWAR TAXICABS: *Packard Motor Car Co. has gone into the taxicab business and is in production on the first postwar models. A new seating arrangement encloses the driver with a plexiglas partition and provides forward facing seats for five passengers without the usual "jump seat." A front seat for two is hinged on the right center pillar. A short wheelbase is designed for easier parking. Functional parts such as axle, clutch and brake are oversize for the rugged requirements of taxicab use.*

In the case of the Kaiser, this body is integrated with frame in monocoque construction. Additionally, the Kaiser uses torsion bar suspension, the first time this type of springing is employed on a domestic vehicle, although the Citroen has used it abroad. The Kaiser, identical in appearance to the Frazer except for its shorter wheelbase, also is distinctive in the way its powerplant is located forward of the axle, and in the fact that the front wheels are driven.

BUT there's many a slip 'twixt mockup and a fast production clip. Willow Run is beginning to be occupied with production machinery, yet there is much to come in. Most of the tooling and die work has been ordered, spread pretty well around Detroit, but practically none of it has yet been delivered, and the presses on which the body dies will operate exist only on paper today. Supplemental welding production work on these at the Warren City division of Graham-Paige may bring them to the factory earlier than competitive deliveries, yet that, too, remains to be seen. On order, it should be noted, are four crank and two toggle presses with 90 x 180 in. bed.

And then there are the suppliers. Borg will build the transmissions, and Borg is well behind orders to older customers today as a result of its recent lengthy strike at Muncie, Ind. Better deliveries can be expected from Monroe Auto Equipment Co., building the torsion bar suspension, and Continental Motors Corp., producing both the 85 hp engine for the Kaiser and the 100 hp unit for the Frazer. But a lot of other parts must be received, as well, before volume production begins at Willow Run.

Notwithstanding this, a lineup of would-be employees formed at the plant gates last week when first word of the new agreement of the company with UAW percolated into print after a dramatic midnight session to announce the terms, at which unexpected titillation was provided by the interruption of the press conference by a near-encounter in fisticuffs between a New York morning paper man and a Detroit evening paper rival disputing when the story would finally be released.

The terms which Kaiser-Frazer accorded UAW were generous enough to cause wonderment in auto company labor relations offices and, probably, to do little to patch up the suspicion with which Detroit regards the West Coast intruder on its factory main line.

Dues checkoff and union shop are contained in the new agreement. So are paid vacations, a union representation deal in which one shop steward represents no more than 250 men and gets paid for a fourth of his timecard time while he's on union business.

More interesting was the much-mooted $5 bonus plan. For every car K-F ships, the company will put $5 in a kitty to be pro-rated at the end of the year on a basis of hours worked between men who took no part in unauthorized strikes. At first blush this sounded like large folding money. On analysis it dwindles somewhat.

The plan concludes Dec. 1, 1946. Between now and then K-F cannot hope to get out more than 125,000 cars or so—$625,000 to split between about 10,000 workers at most. It boils down to 4¢ or 5¢ an hr, if a few assumptions on worktime are made. It's not bad, though, when it is added to the Ford Rouge base rates (highest in the industry, averaging nearly $1.20 in automotive classification) plus whatever pay raise is finally arrived at in the General Motors imbroglio.

•

RFC Approves GM Lease

Washington

• • • **Approval of a lease** offered by the General Motors Corporation (Fisher Body Div.) for the plant operated by the General Machinery Corp. at Hamilton, Ohio, has been announced by RFC. The plant was used during the war for the manufacture of marine steam engines for the Maritime Commission. General Motors plans to use the building for the temporary storage of heavy machinery during construction of a large stamping plant which will employ about 3,500 men.

•

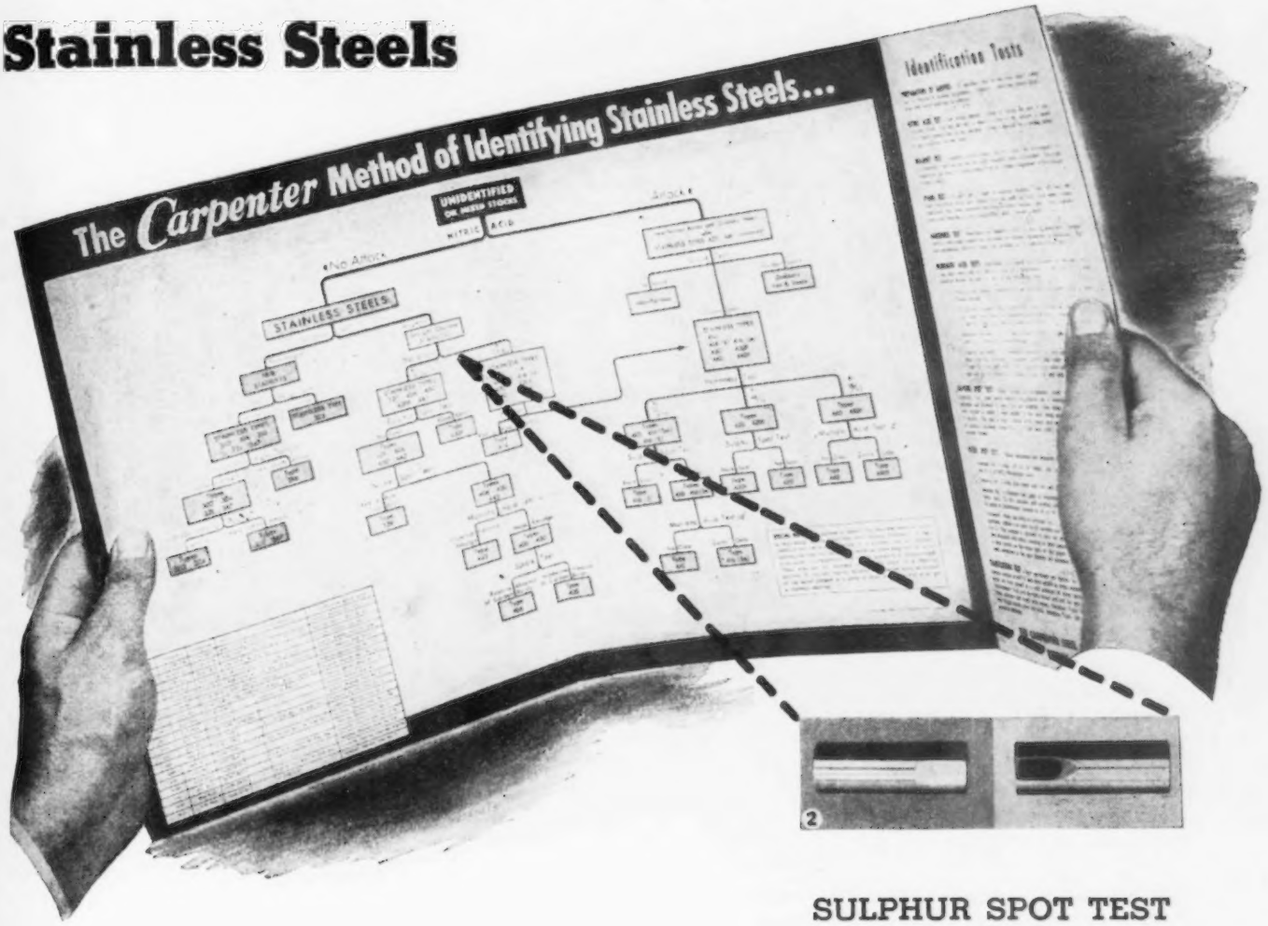
Reports '45 Truck Output

Dearborn, Mich.

• • • **Ford Motor Co.** produced 80,000 light and medium trucks during 1945, it was announced by J. R. Davis, director of sales and advertising.

The company is now in production on a light truck of 114 in. wheelbase, and one and one-half ton vehicles of 134 and 158 in. wheelbases. Also being built are 158 and 194 in. wheelbase school bus chassis and 148½ in. wheelbase, transit bus.

To Help You Identify Stainless Steels



SULPHUR SPOT TEST

This is one of the 11 tests used in the "Carpenter Method of Identifying Stainless Steels".

Place three drops of Sulphuric Acid solution (one part Sulphuric Acid, three parts water) on a newly-ground spot of the specimen and allow to react for one minute. One drop of a 5% solution of Lead Acetate in water is then added to the acid drop and allowed to react for 15 seconds. The spot is then washed with water and examined. A positive test for Sulphur (Stainless Types 416 (S), 420F and 430F) is the presence of a black sulphide deposit.

YOU know the troubles a mix-up in Stainless stock can cause in heat treating, machining, stamping, welding or other fabricating operations. So it's important to you to have a quick method for identifying Stainless that may become mixed in stock.

The Carpenter Laboratories have developed a new and simplified chart for identifying various types of Stainless Steel. The Chart diagrams and explains the nitric acid test, magnet, spark, hardness, and muriatic acid tests, sulphur spot and nickel spot tests, and the stabilization test, and shows when and how to use each one. With this chart you can check the identity of Stainless Steels which may be in question.

Use it in your laboratory, to help your stockroom, warehouse or production department check on mixed stocks. To obtain a copy, simply fill out the coupon.

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Washington . . . L. W. MOFFETT

• Lt. Gen. Campbell urges increased industry-ordnance activities throughout the country . . . New construction expected to exceed 1945 total by 60 pct.

WASHINGTON — With industry - ordnance relationship fostered during the war as a keynote of his postwar educational, administrative and production policies, Lt. Gen. Levin H. Campbell, Jr., Chief of Ordnance, has proposed that besides training ordnance officers in top-flight educational institutions, ordnance executives be given practical training in industrial establishments. He would also like to further mutual understanding between military men and civilians by having key personnel in industry, science and education receive short periods of ordnance training.

Under his proposed streamlining of postwar activities of the Ordnance Dept. to parallel global developments, General Campbell favors not only the establishment of Ordnance Commodity Centers in various parts of the country but the continuance of decentralized procurement districts, now totaling 13, which he said did such a magnificent job during the war. Thus, the ordnance center, the ordnance districts and ordnance arsenals, proving grounds and depots would continue to be focal points of contact with industry—"local town meeting houses" for industry-ordnance activities in all regions of the country.

Personnel training, General Campbell said, must be accompanied by the accumulation and storage of critical ores and metals to cover at least one year's peak demand. Provision also must be made, he declared, for the long-term storage and preservation of our war reserve of rifles, artillery, ammunition, fire control instruments and other materiel. Because material surpluses too frequently stifle development and progress, General Campbell said that the Army should not store weapons and ammunition beyond its needs —sufficient to outfit combat forces and keep them supplied during the early stages of any possible future conflict.

"If we do not advance in step with scientific and technological discoveries, we are seriously jeopardizing our future as a free nation," General Campbell said.

This factor, it was pointed out, underscores the necessity of a well-rounded research and development program.

"In this vastly enlarged, dynamic and highly critical field," the ordnance chief declared, "ordnance will utilize its supersonic and ballistic laboratories at Aberdeen Proving Ground, Md., the radar and electronic laboratory at the National Bureau of Standards, as well as other ordnance and government facilities throughout the country."

But major reliance will continue to be placed, he said, in the great scientific laboratories of our colleges, universities and institutes and in highly modern and well-equipped laboratories of private industry.

General Campbell proposed, as a corollary of research and development, the inauguration of an annual weapons replacement program. He estimates that such a program would insure the production of a number of the most modern and improved models of weapons and vehicles each year; continued extensive research and development and preservation of the weapons-making art as a living, progressive reality.

"The assignment of this replacement work to industry," General Campbell explained, "would have a practical effect in creating a nucleus of ordnance know-how and production efficiency. We cannot afford, as a sensible people, to lag behind in the field of science and technology."

General Campbell pointed up his remarks by saying that public interest in ordnance and a national industrial - military preparedness program must be kept alive. He feels that this can be done by a private voluntary association of citizens of all walks of life rather than by a government public relations bureau. He believes that the Ordnance Dept. will be ready for any possible future demands.

* * *

The average wage earner is receiving $4.43 less weekly since the end of the war, according to a recent study by the Dept. of Labor.

Compiled by the Bureau of Labor Statistics, the report states that due to losses incurred as a result of the differential between wartime and peacetime hours and wages, the average weekly earnings in all manufacturing industries dropped from $45.45 in July 1945 to $41.02 in October 1945.

Prices have advanced, according to the report, all along the line in 1945 for a yearly average of 2 pct which was unchanged from the two previous years although spread across a larger number of commodities.

* * *

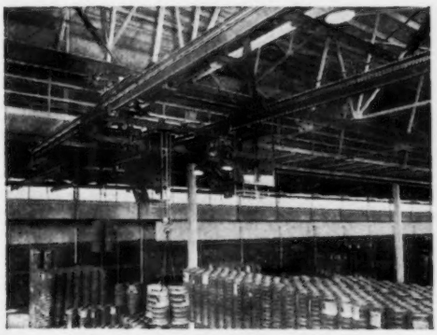
Predicting a 60 pct increase over the 1945 total, the Dept. of Commerce Construction Div. has forecast new construction of $7,500,000,000 in 1946, with a continuation of trend toward increased privately financed projects and a decline in publicly financed operations.

There was one important hitch in the forecast, shortage of manpower and materials. These deterrents, it was pointed out, are expected to continue through the early part of 1946. In view of the labor situation, some observers think this was an optimistic outlook. They doubt that the situation will be cleared that soon.

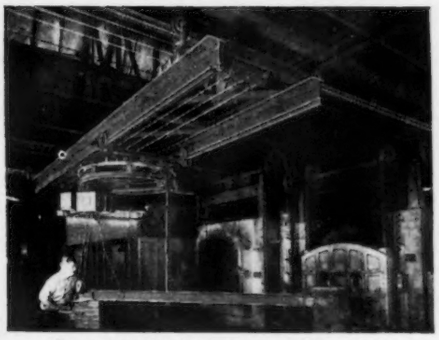
The 1946 forecast places new

The longest crane in the world—overall length of bridge 487 feet.

AMERICAN MONORAIL CRANES



Cab control permits high piling and accurate spotting of heavy, bulky loads.



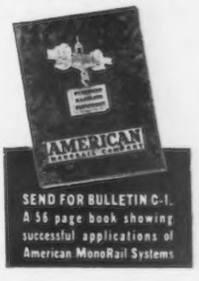
Special double bridge crane with swivel truck allows quick handling at furnace.

Hand operated crane for unloading trucks.

WILL SERVICE EVERY SQUARE FOOT OF YOUR OPERATING SPACE

American MonoRail Cranes supply overall coverage . . . your handling is not tied down to alleyways or spotting and unloading near permanent equipment.

American MonoRail Cranes are available for any type of job—heavy or light duty—full automatic—cab control or hand operated. They can be installed under present operating conditions without excessive structural changes.



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privately-financed construction of all types at $5,350,000,000 compared with $2,723,000,000 in 1945. Privately financed residential construction, exclusive of farm dwellings, the most urgently needed type of building, was estimated at $2,150,000,000 for 1946. This amount was said to be just sufficient to provide 500,000 housing units, representing the minimum goal. Privately financed industrial construction in the present year was placed at $1,150,000,000, an increase of $427,000,000 over 1945. Other types of private construction, the division said, are also expected to show large increases. Publicly-financed construction, highways (estimated at $800,000,000), schools, hospitals, sewers and water facilities, is expected to increase substantially with corresponding decreases in military, naval publicly-financed industrial work.

New construction activity in 1944 and 1945, based on joint estimates of the Dept. of Commerce and the Dept. of Labor, and the Dept. of Commerce forecast for 1946, broken down into types of construction, shown in table at right.

Representing an estimated volume of business of $600 million annually, the Construction Equipment Industry is preparing to establish fair trade practice rules, which in the words of the Federal Trade Commission are "designed to prevent unfair methods of competition and other trade abuses deemed harmful to the industry and purchasers."

TYPE	1944	1945	1946 Forecast
	(Millions of Dollars)		
Total New Construction	4,002	4,751	7,500
Total Private	1,575	2,723	5,350
Residential (Non-farm)	499	770	2,150
Non-residential Industrial	234	723	1,150
Non-residential All Other	148	488	850
Farm	190	200	400
Public Utility	504	542	800
Total Public	2,427	2,028	2,150
Residential	192	72	100
Military and Naval	720	570	150
Non-residential Industrial	748	636	50
Non-residential All Other	131	205	400
Highway	353	284	800
Sewage Disposal and Water Supply	79	97	300
All Other Federal	177	139	350
Misc. Public Service Enterprises	27	25	

A conference has been called by FTC for Jan. 31 at the Edgewater Beach Hotel, Chicago, with Commissioner Lowell B. Mason presiding.

RFC Holds Disposal Sale At New England Center

Washington

• • • **RFC will hold** New England's sales center clearance sale of government-owned property at its Day St., West Springfield, Mass., center on Jan. 21, 22 and 23.

The list includes over 2000 items of machinery, production equipment and material. Every item carries a red tag with price fixed under either the prevailing formula or by fair appraisal. The property consists of compressors, pumps, cranes, heat exchangers, ball bearings, ovens, paint spraying equipment, furnaces, foundry equipment, drilling, engraving, turning, beveling, centering machines, generators, indicating, recording and controlling instruments and accessories, attachments and accessories for machine tools, lathes, presses, drills, punch presses, boring, broaching, milling bushing machines, heat-treating furnaces and devices, tool steel, steel bars, flats, rounds, plates, steel wire, copper strip, aluminum sheets, brass, bronze, monel metal, steel tubing, pipe and fittings.

Although no sales will be made during the inspection period, the public is invited to view the machinery and equipment.

RFC also has announced that negotiations will be closed on Jan. 10 for the sale of a steel foundry at Newcastle, Pa., where the United Engineering & Foundry Co. made rolling mill equipment and heavy machine tools.

Gregory Heads War Assets

Washington

• • • **Effective Jan. 15,** War Assets Corp., RFC subsidiary, will become the disposal agency for government surplus consumer goods and capital and producers goods, taking over these functions from the RFC Office of Surplus Property.

Lieut. Gen. E. B. Gregory, Army Quartermaster General, has been named by President Truman as chairman of War Assets Corp., succeeding Sam H. Husbands, RFC Director who was chosen to fill that office pending the appointment of a permanent chairman.

It was estimated by SPA that during the fiscal year July 1945 through June 1946 consumers and capital and producers goods which cost the government approximately $23 billion will have been declared surplus.

Absorption of Steel Price Increase Set By 1936-39 Standards

Washington

• • • **According to reports** here if the original OPA proposal of $2.50 a ton increase on steel products would have gone through instead of the reported $4 adjustment, steel fabricators and those companies closely allied to the steel industry would have been expected to have absorbed the price increase.

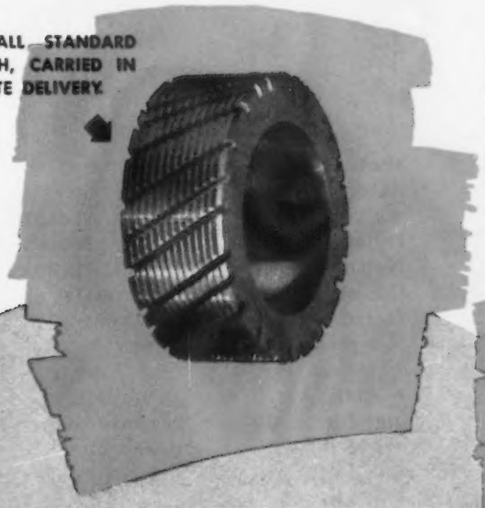
A large percentage of steel fabricators and companies further processing steel products are covered by the same CIO contract as steel producers. A substantial increase in wages with a subsequent increase in basic steel prices will catch such companies in a squeeze play.

If a final increase of $4 a ton on steel products is granted as expected, companies other than steel producers but covered under any wage agreement obtained by the USWA will have to either add it to their job estimates or in the case of products made from steel appeal to OPA for price revision.

The OPA measures the ability of companies to absorb price increases by 1936-1939 standards and on that basis companies closely allied to the steel industry would not be required to make an absorption beyond those standards according to reliable information here.

Regardless of opinions expressed by OPA officials it appears obvious that those companies which are under contract with the USWA but which are not steel producers will face a difficult problem if they are forced to agree to any major wage adjustment entered into by the union and the large steel producers.

CRUSHER ROLLS FOR ALL STANDARD THREADS 8 TO 32 PITCH, CARRIED IN STOCK FOR IMMEDIATE DELIVERY.



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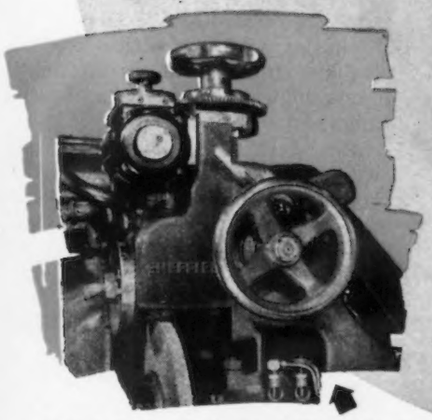
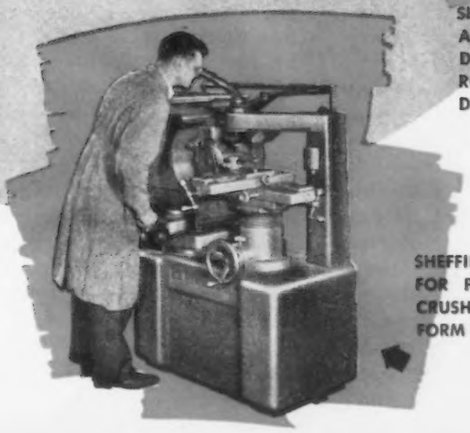
SHEFFIELD PRECISION THREAD AND FORM GRINDER FOR DUPLICATING CRUSHER ROLLS AND THE MASS PRODUCTION OF WORK PARTS THREADED OR FORMED.



POWER CRUSHING DEVICE FOR USE ON THE SHEFFIELD THREAD AND FORM GRINDER FOR THE ACCURATE CRUSHING OF WHEELS.



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West Coast . . .

OSGOOD MURDOCK

• Major effects of minor strikes hampering development . . . Export sales increase but private purchase favored over U. S. Government loan subsidies.

SEATTLE—Pacific Coast industrialists from north to south are pondering the effectiveness of the mutual exchanges of "Happy New Years" so glibly passed on Jan. 1 as the month gets underway. From here down to Los Angeles, labor is causing more hangovers than did New Year's Eve festivities, according to business men caught between heavy demands for their products and material shortages.

Facing virtual strangulation, business in this city is writhing in the throes of one of the most serious labor crises in its history.

Already harassed by the 55-day newspaper strike, 47 Seattle shops are faced with imminent closing by a strike of machinists which would throw some 5000 members of this craft out of work, and last Friday 1100 transit workers put their own strike into effect by driving their buses into the barns to enforce their demands. Local steel producers prepared for the steel strike that had been scheduled for Jan. 14 by cutting off incoming supplies and starting to close down furnaces.

The machinists and the 47 shops affiliated with the Washington Metal Trades Council have been negotiating since Sept. 10 without being able to reach an agreement and a strike vote was scheduled for last Saturday. It is anticipated that no advance notice of the strike date will be given, but that the walkout will be pulled at what is believed to be a crucial moment. Neither Boeing Aircraft Corp. nor the shipyards will be directly affected by this strike, it is stated, but molders and blacksmiths were expected to join the movement.

Journeymen machinists are asking for a 30 pct increase which would raise their wages from $1.25 to $1.62½ an hour and the helpers want to move from 95¢ to $1.23½ an hr.

The machinists' union is reported to have an ample war chest which will enable it to carry on the fight indefinitely.

Seattle citizens will have difficulty getting to and from their jobs and accomplishing other essential tasks while the transit strike continues. It is generally believed that many businesses will either close up entirely or operate with limited personnel at least until wartime car pools are revived for the full utilization of private automobiles because of the dependence which has been placed on bus transportation here. Boeing Aircraft Corp., with an estimated 50 pct of its workers ordinarily traveling by bus and the other half driving cars, began some time ago to lay the groundwork for the formation of car pools to keep them operating during the emergency. Many other companies are trying similar plans.

Indicative of the complexity of the situation is the fact that the bus drivers were getting $1.00 an hr plus the war bonus of 10¢ an hr for 40-hr work, but over 40 hr the bonus was not paid. The result was that overtime paid them less than straight time.

Businessmen of the area believe that the greater percentage of the city's leading industries will be closed completely if the machinists join the newspaper typographers and bus drivers.

SAN FRANCISCO faces a serious curtailment of proposed expansions of facilities and operations by several local firms and the loss of other business which threatens to leave the area because of the 11-week-old strike of machinists, according to Lee W. Delhi, head of the California Metal Trades Assn. He is quoted as saying, "Millions of dollars in business are going to other Coast cities because of this strike which we believe is unpopular with 90 pct of labor in the area."

With 12,000 machinists affiliated with Lodge 68, International Assn. of Machinists and CIO Machinists Local 1304 in the San Francisco and Oakland areas on strike, a total of 55,000 workers are idle. The strike began Oct. 29 in 200 shops and shipyards.

Ralph Hoffman, head of the California Metal Trades Assn. labor negotiations committee, places responsibility for the failure of a settlement largely on business agents of Lodge 68 whom, he states, "are breaking down a philosophy of intelligent negotiations between management and labor which had developed in San Francisco."

The general public of the Bay Area has perhaps been most acutely aware of the strike because of the threatened shortage of milk arising from scarcity of containers, which it is stated by employers, is being caused by the strike of 25 machinists at the American Can Co. in San Francisco, which is a large manufacturer of paper milk cartons. Several other industries are in similar positions with a few machinists stopping all production in plants employing hundreds of other workers.

Among the industries which are either delaying proposed expansion programs or threatening to leave the area are Western Crown Cork & Seal Co., Link Belt Co., and Joshua-Hendy Iron Works, according to officials of the CMTA.

Los Angeles has not developed any serious labor difficulties of a local nature, but negotiations in an attempt to establish an industry-wide labor agreement in the plants of the four major aircraft manufacturers in that area have failed completely, according to recent reports from representatives of both management and labor.

One of the most striking aspects of the West Coast labor situation is the fact that local employers are beginning to realize that even when so-called successful negotiations with local labor unions have been consummated, these agreements are predicated on national or Eastern contracts and that both labor and management have, in effect, lost the right to deal with local labor unions on local labor prob-

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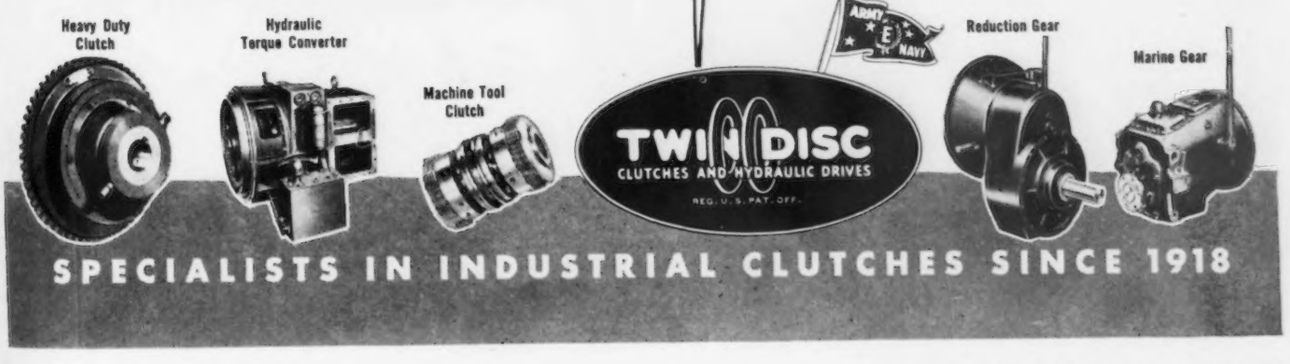
That's why, today, many nationally recognized manufacturers look to Twin Disc to satisfy *all* their requirements in the field of power linkage. If you, too, have a problem of power transmission or control, why not ask the advice of Twin Disc Engineers? Their experienced counsel is yours for the asking—without obligation. Write TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

lems; that concentration of labor power is now centered in the East.

SAN FRANCISCO—While West Coast manufacturers and steel users are beating the bushes as well as their hyperbolic breasts for every last ton of available steel, Coast mills are beginning to develop substantial outlets for surplus items in the Pacific export market.

In addition to Henry Kaiser's recently announced export order for 55,000 tons of billets, the Fontana mill has also been awarded an additional contract for 43,000 tons of plate. Over and above this, Fontana has also landed a small order for an additional quantity of plate from a private Chinese buyer. This raises the known volume of export orders on Coast mills to more than 160,000 tons.

Additional emphasis on the importance of the Pacific export market is lent by the fact that Chad F. Calhoun, vice-president of Kaiser Co., Inc., is currently taking the proper medical precautions preparatory to a trip to the Philippines and the Orient. Among the objectives for Mr. Calhoun's trip is the consummation of plans to build a shipyard for the Ming Sung Industrial Co., of Shanghai. This firm intends to build river vessels and coastwise ships and to engage in the general steel fabrication business. Transmers Corp., a New York export house, is reported to have handled the negotiations for the venture.

With export restrictions to the Philippines being rapidly lifted, and the prospective stabilization of the Chinese monetary system, market research departments of Coast steel companies are setting a figure of one million tons on the annual Pacific Basin export market and one member of the industry, at least, is setting out to make an on-the-spot study of the market potentialities before they are captured by the recently expanded Indian and Australian steel producing facilities.

Coast steel men are beginning to realize that the Pacific Basin market for steel is a good deal more inviting now than in prewar times due to pent-up demand and contemplated industrial expansion in the Orient as well as the necessity for obtaining additional tonnage to satisfy the West Coast's war expanded ingot capacity.

It is believed in local steel circles that United States producers will share in a greater proportion of this market than prior to the war, since European producers will not be in a position to offer serious competition for some time to come.

The immediate deterrent to full blown enthusiasm is the fact that those exports which are in heaviest demand—tin and terneplate, black sheets, wire, nails and galvanized sheets—are those for which local users are scrambling.

Financing these purchases for export is often a stumbling-block. In too many cases, it has been found, foreign buyers have been prone to rectify the barren state of their exchequers with expectations of borrowing from the United States, and local mills—hungry as they may be for certain items of production—have been reluctant to enter into contracts predicated on ephemeral finance.

One move in the right direction has been the founding of a branch of the China-American Council of Commerce by leading American industrialists and Chinese representatives who have indicated a desire to buy approximately $100 million worth of railway equipment, machines, and almost anything else which would help industrialize China.

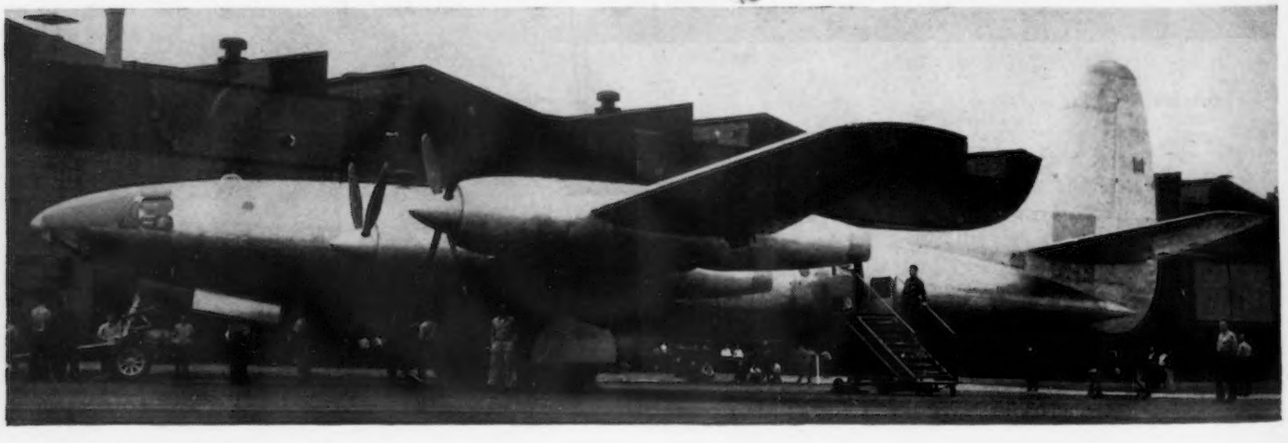
Producers in this area are taking advantage of their proximity to the market to try and capture a favorably disproportionate share of the $25 billion which a purchasing commission for the Dutch East Indies is reported to be spending for heavy machinery, tools, pumps, food, drugs and clothing in this country.

Latin America, according to local manufacturers, is considered a bright prospect for exporters on this Coast because of the three to four billion dollars of American credit which has been built up during the war period.

Patrick W. McDonough, president of the McDonough Steel Co., of Oakland, and a director of the Smaller War Plants Corp., expressed a pessimistic opinion of the export field on his return from a junket throughout the Orient in the company of Maury Maverick, chairman of the SWPC. Mr. McDonough said that in his opinion the cost to America of maintaining a sizable export market might be too great if it required loans from the U. S. Government.

"I am opposed to large loans from this government to foreign countries," Mr. McDonough said, "but if such loans are made, let us control the use of the money as would an American banker if he were to grant such loans."

HI CLASS PHOTOGRAPHY: ***The photo shows the new Army photo reconnaissance plane, the Republic XF-12, which has been under secret development for the past 2 yr. The unusual engine nacelles, are almost the same size as the fuselage of one of Republic's famous P-47's. Particularly noticeable is the extreme streamlining of the plane from nose to tail and from propeller spinners to the exhaust jet assist feature of the engine nacelles.***



THIS VERSATILITY

Also Has Many POSTWAR USES

The myriad requirements of war demonstrated the amazing versatility of Vickers Hydraulic Controls. There were so many kinds of jobs to do—jobs which had to be done better than ever before—jobs which had never previously been accomplished.

For example, in this illustration, the plane has Vickers Hydraulic Control for brakes, automatic pilot and cargo door operation. The lift trucks have Vickers Hydraulic Control which lifts and positions the load accurately at the finger-touch of the operator. The graders building air fields use Vickers Hydraulic Power for steering front and rear wheels, raising, lowering or side shifting the blade, and operating the attachments.

These are just a few of the war jobs Vickers Hydraulics have done. Others include the precision movement of heavy battleship turrets—the automatic aiming of anti-aircraft guns—the fast precision positioning of ammunition hoists—the control of bomber gun turrets—and others which, cannot yet be described.

Many of the intricate machine tools that produced the machines that won the war depended for their accuracy, production speed, and ease of operation upon Vickers Hydraulic Controls.

This demonstration of the remarkable versatility of Vickers Hydraulic Controls suggests many new applications to a wide variety of postwar equipment.

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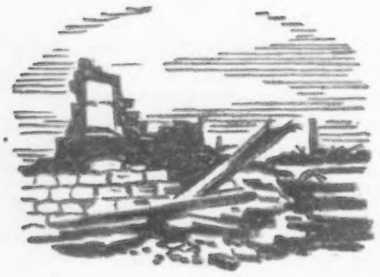
ANY SEQUENCE OF MOTIONS • ANY ACCELERATION OR DECELERATION • ANY THRUST . . . . . .

European Letter . . . JACK R. HIGHT

• French iron and steel industry staging slow recovery . . . Latest figures indicate output has now recovered to a level of about 33 pct of 1938 operations.



PARIS—After a total stoppage of operations in French iron and steel works at the time of their liberation in September 1944, production has slowly recovered to a level of approximately 33 pct of 1938 operations. Provisions of metallurgical coke, supplies of which must come primarily from Germany, continues to be the overall limiting factor in French production.

The average production for the first half of 1945 amounted to approximately 60,000 metric tons of iron per month which is about 12 pct of the 1938 monthly average, 86,000 metric tons of steel which is 17 pct, and 54,000 tons of finished products which is 16 pct. The last months of 1945 have seen production reach 169,000 metric tons of iron in November, which is 33 pct of the 1938 monthly average; 226,000 metric tons of steel, which is 44 pct, and 165,000 tons of rolled products, which is 49 pct of the of 1929 and 1938 shown above.

Table I, shown above, compares French production for the year 1945 with those of 1929 and 1938.

Most of the difficulties which French industry is facing today, both in basic iron and steel production as well as in the manufacture of finished products, is either directly or indirectly due to the shortage of fuel supplies. In 1938 the iron and steel industry in France consumed 6,284,919 tons of coke for the production of 6 million tons of pig iron. The coke for the blast furnaces came from three distinct sources:

(1) The coke works located at the coal mines, principally in the mining regions of the Nord and Pas de Calais regions of France.

(2) Coke works located at iron and steel mills, which consumed approximately 20 pct French coal and 80 pct imported coal.

(3) Coke imported directly, principally from Germany.

At the beginning of the war, France was importing approximately 40 pct of the coke consumed in her blast furnaces, but her dependence on imported fuel was even larger than this figure, as the coke plants located at the blast furnaces drew about 80 pct of their coking coal from imports. Taken together the French blast furnaces imported in the neighborhood of 60 pct of all fuel consumed, about 40 pct of this figure in the form of coke and about 26 pct in the form of coking coal.

One of the most encouraging aspects of the French recovery effort is the great progress which has been made in domestic coal production, which, during the last three months of 1945 reached approximately 90 pct of the 1938 average.

France is today experiencing extreme difficulty in obtaining the coke fines which are needed from outside sources to re-establish her prewar production. The importations for all the industries of France in October 1945 was 752,000 metric tons against an average of 1,557,000 per month in 1938. Imports from Great Britain dur-

TABLE I

(In thousands of metric tons)

Year	Pig Iron	Steel	Finished Products
1929	10,364	9,700	6,721
1938	6,061	6,186	4,074
Monthly average 1938	501	515	334
1945, first half	360	516	324
July	100	119	88
August	106	139	92
September	124	169	125
October	148	207	161
November	169	226	165
**December	173	224	165
Total for year	1,180	1,600	1,120

** Estimated.

BACK TO THE FARM: *The Ford factory at Leamington Spa, England, which during the war supplied tank parts, has changed over to peacetime practices and is turning out 30 ploughs per day. Here completed ploughs are given a final check before dispatch.*

here's why every progressive design engineer should *investigate*—

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QUENCHED AND TEMPERED COLD FINISHED BARS

Quenched and tempered, cold finished bars are of distinct advantage to the fabricator who is required to produce definite physical properties in the finished part. At a slightly higher material cost than annealed cold finished bars, the heat treated bar eliminates the necessity for heat treating after machining and avoids distortion, straightening, cleaning and the setting up of the correct heat treating cycle. The part made from heat treated bars can be plated or otherwise finished without delay after machining.

In the heat treating operation the grain structure resulting from the hot rolling is completely wiped out and replaced by a new refined and uniform structure. The temperatures and cooling conditions during hot rolling may vary considerably throughout the bars, resulting in a variation of structure and properties. The variable structural condition is erased by the heating, quenching and drawing operations of the heat treatment and replaced with a new uniform structure giving a better combination of strength and ductility.

The user of heat treated bars has in his stock pile a partially completed part which has merely to be extracted by machining. For instance, the production of shafts from heat treated turned bars may require only cutting to length and milling keyways. The money savings over the method of cutting annealed bars, heat treating, sandblasting and straightening are very considerable. Also the task of keeping records of the shafts going through heat treat is ended. The time to start and finish a requirement is reduced.

The heat treated bars can be well sampled and tested for physicals while parts are sometimes difficult or impossible to test for any property but hardness. Hardness alone is not a true test as while it is correlated with tensile strength, it does not give an indication of yield strength or ductility.

For automatic screw machine use, there are practical limits to the hardness of the steel to be machined. These limits will vary with the part being produced, the equipment used for machining and the ability of the machinist to adjust his machining conditions to obtain maximum results. For many parts on which the physical requirements are not over 145/150,000 psi tensile (a large number of specifications will fall within this range) the uniformity of the heat treated bars will enable the machinist to handle the steel without too great a loss in production as compared to a well-annealed bar and in the lower ranges of physicals such as 125,000 minimum tensile, the heat treated bar has been found to machine more uniformly and with better production than softer steel which sometimes produces a gummy condition. The higher carbon structural steels such as 4150, 3150, etc. show good machinability in the heat treated condition provided the physical requirements are not too high.

Wyckoff metallurgical engineers will welcome the opportunity of demonstrating these known advantages of Wyckoff Heat Treated Bars on your operations.

Wyckoff STEEL COMPANY

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ing that month amounted to only 128,000 tons against 529,000 for the same month in 1938. Imports from Germany for the month were 144,000 tons against an average of 460,000 tons per month in 1938. The situation is aggravated by the small shipments of the coke which is so important to French blast furnaces.

The average of French coke imports per month for 1938 was approximately 197,000 metric tons, while her receipts from abroad in October of last year totaled only 77,000 tons. Of this figure 37,000 tons came from the Ruhr and the Saar, the largest producing areas, as against 90,000 tons from those same sectors in 1938. Imports from Belgium to France are rapidly recovering their normal peacetime scale and have now reached approximately 80 pct of the 1938 figure.

The iron and steel production picture in France has been, since the liberation, a series of successive major problems, most of which have already disappeared, but the provision of fuels—notably coke and coke fines—which is under the direction of the European Coal Commission meeting in London, remains as the basic and apparently insoluble problem.

Iron ore resources in France are actually the most important basis of her industry, with production exceeding 50 million tons annually in 1929 and approximately 35 million tons annually on the eve of the war. Of this total 44 pct was used in exports to pay for the fuel supplies which France needed in her own steel industry. The ore mines themselves, with the exception of those in Normandy, were virtually unharmed by the war, but a shortage of electrical energy has limited their production.

The monthly average of iron ore production in 1938 for all of France totaled 2,765 000 metric tons. while July of last year saw a production of only 667.000 metric tons. The September figures reached 853.000 tons, and there were hopes that by the end of 1945 production would reach approximately 1 million tons per month.

Plans which the French government and industrial leaders have been considering for the modernization and rationalization of steel works must necessarily await a final decision by the Allied governments as to the ultimate size of the German industry. Until such a decision has been made, France cannot know whether her problem is simply one of modernizing existing facilities without a basic increase in capacity, or whether a 10 or 20 pct increase in steel capacity is indicated. The French industrialists are also anxious that some means will be furnished in the final settlement for Western Europe to guarantee France's fuel supplies from the Ruhr.

As a part of the envisaged program, two continuous wide strip mills, which will cost in the neighborhood of 9 billion 600 million francs at the new rate of exchange, are contemplated. The installation of these mills will place France in an up-to-date position in the production of automotive sheets and tinplate, but will make it necessary, of course, for certain existing capacity which has become obsolete to be withdrawn from production. Steel executives in France are cognizant of the general need to centralize production of various products into larger units than were known in prewar Continental practice in the interests of economy.

The requirements for the French market in normal times are in the neighborhood of about 6 million tons per year. The French government is most anxious to see steel production at a high enough level to rebuild the losses of five years of war, and reconstruct both France itself and her colonies. The government is almost equally anxious for France to regain its place in the international steel trade.

As regards the steel industry of the Saar, which France now controls, it is principally centered about Burbach, Dillingen, Neunkirchen and Voelklingen. One blast furnace which has been relit at Voelklingen will produce 10,500 tons of pig iron per month. A part of the works at Dillingen which has suffered considerable war damage will produce 4500 tons of sheets and 700 tons per month of plate.

The repercussions of four years of occupation and a German inspired inflation left the French heavy industries in an extremely serious financial situation. Despite a general increase in capital of most of the firms, the uneconomic operation at less than a third of their capacity while maintaining large lay-rolls has left the industry with seriously depleted reserves. Efforts are being made to either lighten the overhead obligations of the industry as well as to raise the capital necessary for re-equipment and rationalization.

Existing French steel prices are indicated in francs per ton in Table II.

TABLE II

	Francs per Ton	
Pig Iron		
Phosphorus iron, P.L. 3	2,350	
Hematite iron (refined)	2,640	
Hematite iron for casting	2,680	
Rolled Steel	**Thomas**	**Martin**
Forging blooms	3,915	4,537
Forging blooms, superior quality	.....	5,203
Forging billets	4,125	4,747
Forging billets, superior quality	.....	5,306
Beams, I.P.N.	4,499	5,329
Heavy plates	5,358	6,200
Heavy sheets	5,789	6,631
Medium sheets	6,353	7,251
Light gage sheets	7,012	7,910
Galvanized sheets	9,559	
Magnetic sheets	16,100	
Tinplate	15,152	

British Railroads To Be Nationalized Next

London

• • • **Predictions here** indicate that next item on the list of industries to be nationalized will be the railways, with some possibility that appropriate legislation may be introduced this spring. Recent opinion expressed here was that the measure would not see light of day before next autumn, but the introduction of the Coal Nationalization Bill on schedule before Christmas has changed this viewpoint somewhat.

If the example of the coal bill is followed, the companies will not see a draft of the bill in advance, but will get their first view when the measure is introduced by the government in Commons.

Inspection of a recent white paper on the nationalization of civil aviation in Britain offered few surprises after the initial announcement which had already been discussed in Parliament. With approval of the white paper expected for this session of Parliament, the government hopes to have the three corporations, which will be the operating medium, in operation by this fall.

MACHINE TOOL CONTROL

built to Specification★

New electrical standards for machine tools have been announced after joint conference of the National Machine Tool Builders' Association and representatives of large users (primarily among the automotive industry). Characteristic construction features required are shown below. Requirements peculiar to the automotive industry are shown in *italics*.

ENCLOSURE: NMTBA:
Semi-dust tight (NEMA Type IA) enclosure has no unfilled holes when mounted.

Hinged cover swings horizontally and has adequate means for fastening in closed position.

AUTOMOTIVE:

Enclosure with no holes necessitates external mounting feet.

Cover must be held closed with bolts or screws which require the use of a tool to remove.

REDUCED VOLTAGE CONTROL CIRCUITS: NMTBA:
110 volt control circuit is obtained from a transformer with isolated secondary winding protected by fuses or equivalent overcurrent protective devices.

All operating coils of magnetic devices are connected to the same side of the control circuit with no contacts interposed except overload relay contacts. A terminal is provided on panel for grounding coil side of transformer secondary if conditions permit.

AUTOMOTIVE:

Additional transformer capacity is provided for a 100 watt, 110 volt machine light.

Transformer will have dual primary winding for 220/440 volts unless otherwise specified.

DISCONNECT SWITCH: NMTBA:
NEMA Type A Manually operated, non-fusible switch or circuit breaker disconnects are arranged to be locked in "OFF" position and are mechanically interlocked with control enclosure door. Fusible disconnect switches are available when specified.

PANEL WIRING: NMTBA:
Wires are supported mechanically where necessary to keep them in place.

Terminals are provided for all outgoing wires.

Terminal markings correspond with the markings on the wiring diagram. Wire insulation is synthetic compound, not less than 3/64" thick. Load and control circuits are distinguished by color.

BASE PLATE: NMTBA:
All front connected devices are mounted on rigid base plate to permit removal of complete control panel.

Ample room is provided between base plate and enclosure for proper maintenance and electrical clearance.

WIRING DIAGRAMS: NMTBA:
Attached to inside of control enclosure door by adhesive material or permanent data pocket, depending on size.

Elementary diagram is included on wiring diagram.

CONTROL DEVICES: NMTBA:
Devices such as motor starters, contactors, timers, etc. are built to ASA and NEMA standards and are designed to facilitate combination into special control panels.

AUTOMOTIVE:

No starter smaller than Size 1 used on any motor.

SQUARE D is prepared to build control to NMTBA and Automotive Standards or any other specification developed to promote safety of personnel, uninterrupted production and long life. Square D Field Engineers, stationed in branch offices in all principal cities, are thoroughly qualified to assist in the design and application of such control.

SQUARE D COMPANY

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PERSONALS

° ° °

• **Thomas B. Blackwood** has joined the metallurgical dept. of the Vanadium-Alloys Steel Co. of Latrobe, Pa. Mr. Blackwood was formerly employed by Universal Cyclops Steel Corp.

• **James S. Duncan,** president of Massey-Harris Co., Ltd., Toronto, has been elected a director of the International Nickel Co. of Canada, Ltd., to fill a vacancy on the board. Mr. Duncan is chairman of the board of the Massey-Harris Co., Racine, Wis.

• **A. J. Fazio** has been appointed general superintendent of the Braeburn Alloy Steel Div. of Continental Industries, Inc., Braeburn, Pa. In past years he has served as assistant general superintendent for the Braeburn Alloy Steel Corp.

• **Amos B. Miner** has been appointed manager of industrial sales for National Gypsum Co., Buffalo.

• **W. T. Ayer** has retired from the engineering dept. of Hercules Powder Co., Wilmington, Del., after 27 yr with the company. Mr. Ayer has been responsible for many design improvements in the explosives and other industries with which Hercules is associated.

• **Walter F. Nicoden** has been appointed assistant general superintendent of Edgar Thomson Works, Braddock, Pa., Carnegie-Illinois Steel Corp., succeeding **John Lloyd** who has retired after 46 yr of continuous service in the steel mills. Mr. Nicoden joined Carnegie-Illinois in 1933 as a metallurgical observer at Homestead Works. In 1937 he became assistant superintendent of open hearth No. 4 and 3 yr later was made superintendent of the plant's entire open hearth dept., the position he leaves to assume his new duties.

• **Walter W. Arpe** has been appointed general manager of sales of Laclede Steel Co., St. Louis.

• **B. C. Colcord,** who has been assistant vice-president, operations, Pittsburgh, has been appointed general superintendent, Lorain, Ohio works, National Tube Co., U. S. Steel subsidiary. **L. F. Sattele** has been named assistant general superintendent of the plant.

• **L. R. Steuer,** manager of sales, Carbon Bar Div. of Bethlehem Steel Co., Bethlehem, Pa., has retired.

• **Thomas F. Fox,** transportation supervisor of American Steel & Wire Co., Worcester traffic dept., has retired after 30 yr service with the company.

• **Jesse G. Eddy,** assistant production manager, General Electric Co., Pittsfield, since 1923, **Edwin Stanley,** member of the management staff since 1918, and **Edward C. Boutwell,** another 40 yr pluser, have retired.

• **Orville O. Barton** has been made assistant to the manager of the General Electric Co.'s Meriden, Conn., works of the Plastics Div. of the company's Pittsfield plant.

• **James White** has been appointed controller of materials for the Tomkins - Johnson Co., Jackson, Mich.

• **Benjamin S. Dowd** has been elected president and general manager of Vulcan Iron Works, Wilkes-Barre, Pa. He was formerly executive vice-president. **J. F. O'Brien** has been appointed director of purchases, **George W. Walter,** works manager, **Joseph Lehnert,** production manager, and **C. A. Netter,** in charge of planning.

BENJAMIN S. DOWD, president and general manager, Vulcan Iron Works.

• **Joseph L. Turner** has been appointed director of industrial relations of Columbia Steel Co., San Francisco, a U. S. Steel Corp. subsidiary. Mr. Turner, who has been in the steel business since 1928, succeeds **Henry T. Lintott,** resigned. Mr. Turner started his career with Lukens Steel Co. in Coatesville, Pa. After 8 yr with this firm, he joined Wheeling Steel Corp. as assistant to general manager of the Portsmouth, Ohio works. Four years later he was promoted chief industrial engineer at Wheeling, W. Va., which position he held until his new post with Columbia Steel Co.

• **Oscar H. D. Rohwer,** vice-president of Universal Atlas Cement Co., Chicago, U. S. Steel Corp. subsidiary, has retired. He is succeeded by **Fred T. Wiggins,** former sales manager of the company at Birmingham and recently assistant to vice-president in New York, who now becomes vice-president of the western region with headquarters in Chicago.

• **Newton O. Holt** has been appointed senior contracting manager of the Chicago district, American Bridge Co., succeeding **Walter G. Zimmermann,** who has retired. Both Mr. Holt and Mr. Zimmermann are veterans in the Bridge company organization, the former having started as a draftsman 32 yr ago and the latter as a clerk 43 yr ago. **Leland E. Grafft,** former contracting engineer at Chicago, becomes a contracting manager there.

• **L. R. Hays** has been elected treasurer of the H. C. Frick Coke Co. and the U. S. Coal & Coke Co., Pittsburgh, and associated companies, succeeding **C. S. Wardley** who has retired after over 52 yr with these U. S. Steel subsidiaries. Mr. Hays was employed in the treasury dept. of the U. S. Coal & Coke Co. in 1919. He was made assistant secretary and treasurer of the company in 1942, the position he held when elected to his new office.

• **Arthur P. Jenks,** Chicago district sales manager of the ACF-Brill Motors Co., has retired from active service.

• **E. J. Protin** has been appointed vice-president in charge of a newly created Products Development Research Div. of the Pittsburgh Steel Co., Pittsburgh. **J. H. Morrison,** who rejoined the company last October as general works manager, has been named vice-president in charge of operations, a post which Mr. Protin has held since February 1942.

• **Edward P. Geary,** who has been assistant vice-president in charge of sales of the Rustless Iron & Steel Corp., Baltimore, for the last 6½ yr, has resigned.

• **William D. Truesdale,** vice-president in charge of finance, Inland Steel Co., has retired after 38 yr of service with the company. First associated with various U. S. Steel Co. subsidiaries, he joined Inland in 1907 as general auditor, later becoming treasurer, secretary, and finally vice-president in charge of finance. He has been a director since 1924.

• **Orville F. Figley,** since 1942 assistant manager of sales, Chicago district, U. S. Steel Supply Co., has been appointed sales manager succeeding **Andrew Verschuur,** who has retired after more than 51 yr service. Mr. Figley has been associated with the U. S. Steel Corp. organization for 36 yr having started as a sales clerk. **Walter P. Maguire** has been appointed Baltimore district plant manager succeeding **James B. McIntyre** who has retired after 43 yr service. Mr. Maguire has been with the corporation for the last 35 yr and recently has been sales manager in the Philadelphia office. He will be succeeded at Philadelphia by **George R. Jones, Jr.**

• **George E. Shepard**, assistant general contracting manager of the American Bridge Co., Pittsburgh, has retired. He began working in 1899 for the Keystone Bridge Co., which became a part of American Bridge the following year. In 1915 he became a salesman for American Bridge and served successively as assistant division contracting manager and division contracting manager. He was appointed assistant general contracting manager in 1931 and held that position until his retirement.

HARRY O. BERCHER, general manager, Steel Div., International Harvester Co.

• **Harry O. Bercher** has been appointed general manager of International Harvester Co.'s Steel Div. succeeding **George E. Rose,** vice-president in charge of the division, who has retired after nearly 40 yr of service with the company. Mr. Bercher joined the company in 1928 at its iron ore mines, serving later in various positions in the company's general offices at Chicago, at its coal mines, and at Wisconsin Steel works. He was appointed assistant to the vice-president last year. Mr. Rose, who joined the company in 1906 at Wisconsin Steel works as superintendent of the blast furnace dept., became assistant general superintendent of the mill in 1909, general superintendent in 1912, assistant to the vice-president in 1936, and was elected vice-president in 1937.

• **Rolland R. LaPelle,** formerly manager, Special Furnace Div., has been elected vice-president of Dempsey Industrial Furnace Corp., Springfield, Mass.

• **Irving M. Smith,** acting general manager of sales of Central Iron & Steel Co., Harrisburg, Pa., has been appointed general manager of sales.

• **John B. Mitchell** has been appointed assistant to the operating vice-president, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Mitchell's entire business career has been in the steel industry, starting with J & L in 1915 in the Aliquippa works machine shop.

• **Victor L. Persbacker** has been elected assistant comptroller of the American Brake Shoe Co., New York, the Canadian Ramapo Iron Works, Ltd., and the Dominion Brake Shoe Co., Ltd.

• **A. T. Oyston** has been appointed assistant secretary of U. S. Steel Corp., New York, succeeding **A. T. Duffield** who has retired. Mr. Oyston entered the employ of U. S. Steel in 1919 in the office of the secretary and treasurer. In 1930 he was appointed second assistant secretary, a position he held until he assumed his new position on Jan. 1. He is succeeded as second assistant secretary by **Elmer Beh.**

• **William H. Collins,** manager of Bethlehem Steel Co., Boston district shipbuilding, has been made vice-president in charge of shipbuilding. He is succeeded by **John T. Wiseman,** heretofore manager of the Quincy yard. **Samuel Wakeman,** in charge of the Hingham yard during World War II, is now manager of the Quincy yard, while **Henry W. Hazzard,** formerly assistant to Mr. Wiseman at the Quincy yard, is manager of the Boston yard.

• **Charles J. Hardy** has resigned as president of Carter Carburetor Corp., wholly-owned subsidiary of American Car & Foundry Co., New York, and was elected chairman of the board. **Hugh H. C. Weed,** formerly vice-president and general manager, has been elected president and general manager of the company. **M. F. Peterson,** formerly assistant to general manager, has been elected a vice-president, with **George R. Ericson,** patent counsel, and **Charles J. Hardy, Jr.,** being elected directors.

• **Fordyce Coburn,** vice-president in charge of operations of the E. & G. Brooke Iron Co., Birdsboro, Pa., has been elected a director of that company and the Richard Ore Co.

• **L. B. Miller,** sales executive, and **Allen Butler,** manager of the Chicago office of Perfex Corp., Milwaukee, have been appointed vice-presidents in the Controls Div. of the firm. **I. G. Bohrman,** manager of the Radiator Div., has been made vice-president in charge of that division.

• **Frank J. McGinnis,** recently with Campbell-Ewald Co., Detroit, has been named to head Ford Div. passenger car advertising of Ford Motor Co., Dearborn, Mich. **Ben R. Donaldson,** veteran in the Ford advertising dept. has been named assistant director of advertising and will coordinate the company's advertising activities. **Walter E. Blanchard,** in the government contracts dept. at Ford since 1941, will assist Mr. Donaldson.

• **J. J. Daggon** has been appointed to the post of vice-president in charge of sales of Leland Electric Co., Dayton. Mr. Daggon has been associated with the company since 1930, and for the past 3 yr was assistant to the vice-president in charge of engineering.

• **John H. Sipchen** has been appointed to represent Erie Foundry Co., Erie, Pa., in the sale of its hammers and presses in the territory served from Chicago. He succeeds **L. F. Carlton** who had represented them for about 20 yr, and who died recently.

• **George W. Veale,** vice-president of the Eaton Mfg. Co., Cleveland, has been appointed general manager of the company's Axle Div. He has been associated with the company since 1920 when he became production manager of the axle plant.

• **E. G. Price** has been appointed general superintendent of National Works, National Tube Co., McKeesport, Pa. He succeeds **R. M. Overton** who is promoted to the staff of B. H. Lawrence, vice-president of engineering, U. S. Steel Corp. of Delaware.

• **Paul L. Lindsay** has been named general staff manager—sales of the American Steel & Wire Co., Cleveland. Mr. Lindsay, in addition to other duties, will assume the responsibilities of **V. H. Farr,** assistant general manager of sales, who has retired after 45 yr of service with the company.

• **James F. Collins** has been appointed field engineer and sales representative for the Ajax Flexible Coupling Co. Inc., Westfield, N. Y. Mr. Collins succeeds **George C. Ewing** who has resigned.

• **Edmund S. Murrah,** formerly of the steel mill section, Industrial Engineering Div., General Electric Co., Schenectady, has become associated with the research dept. of the Morgan Construction Co., Worcester.

• **Claude S. Lawson,** general manager of Sloss-Sheffield Steel & Iron Co., Birmingham, has been appointed vice-president and general manager. Mr. Lawson succeeds **Ben Davis** who has retired after being associated with Sloss-Sheffield since 1930.

• **L. D. Reilly** has retired as general manager of the Ambridge, Pa., plant of American Bridge Co., after 29 yr in that position. He is succeeded by **Oscar Seidel,** formerly manager of the Structural Fabricating Div. at Ambridge. **Frank D. Rideout,** contracting manager of the American Bridge Co.'s Cleveland office, has retired after 44 yr of continuous service with the company and will be succeeded by **Charles A. Harris.**

• **Homer Carder,** who has been in charge of the by-product recovery operations at the Tarrant plant of the Alabama By-Products Corp., Birmingham, has been appointed works manager at the plant, and **H. B. Owen,** who has been in charge of the coke operations, has been appointed production manager. The promotions follow the retirement of **A. G. Overton,** one of the corporation's vice-presidents, who had been in charge of the Tarrant operation.

• **Harry B. Newell** has been elected president of the Ohio Forge & Machine Corp., Cleveland, succeeding the late **S. C. Dalbey.** Mr. Newell has been executive vice-president of the company.

• **Joseph C. Rovensky,** formerly vice-president of the Chase National Bank, has been elected chairman of the board of Luria Steel & Trading Corp., New York. **Lt. Com. David Luria, Maj. Ted Luria** and **Lt. Mortimer Luria** have returned from active duty with the armed forces and are resuming their activties with the company. **J. R. Morley,** formerly with Great Lakes Steel Corp., has joined the Detroit office of the corporation.

• **J. Milton Shatzel,** former production manager of Graham-Paige Motor Corp., has been appointed works manager of Federal Motor Truck Co., Detroit.

• **Mrs. Paula S. Hoddeson** has been appointed manager of advertising and sales promotion of Walker-Turner Co., Plainfield, N.J.

...OBITUARY...

• **W. B. Lake,** president of Lake & Elliot, Baintree, Essex, England, died Dec. 29. He was president of the British Institute of Foundrymen 1939-40, and presided over the last International Foundry Congress held in London in 1939.

• **Gerhardt G. Krueger,** 48, Milwaukee sales manager for the Allegheny-Ludlum Steel Corp., died Dec. 30 in a hospital there after an illness of 3 months. He had been with Jessop Steel Co. for 15 yr before joining Allegheny-Ludlum.

• **George Bridges,** 58, pump application engineer and an employee for 40 yr of the Worthington Pump & Machinery Corp., Harrison, N. J., died recently.

• **Harold Rossum,** for many years connected with the National Malleable & Steel Castings Co. at Chicago, and later associated with the American Chain Co. and the Lake City Malleable Co., died recently.

• **John Warnock,** 72, assistant treasurer of the Cheney Bigelow Wire Works, Springfield, Mass., until his retirement 3 yr ago, died recently.

• **George W. Clark,** 74, inventor and manufacturing manager of the Westfield Mfg. Co., Westfield, Mass., died recently.

• **John G. Coleman,** 88, former president of the Waukesha Malleable & Iron Works, now the Federal Steel Sash Co., Waukesha, Wis., died Dec. 26.

WORTH REMEMBERING

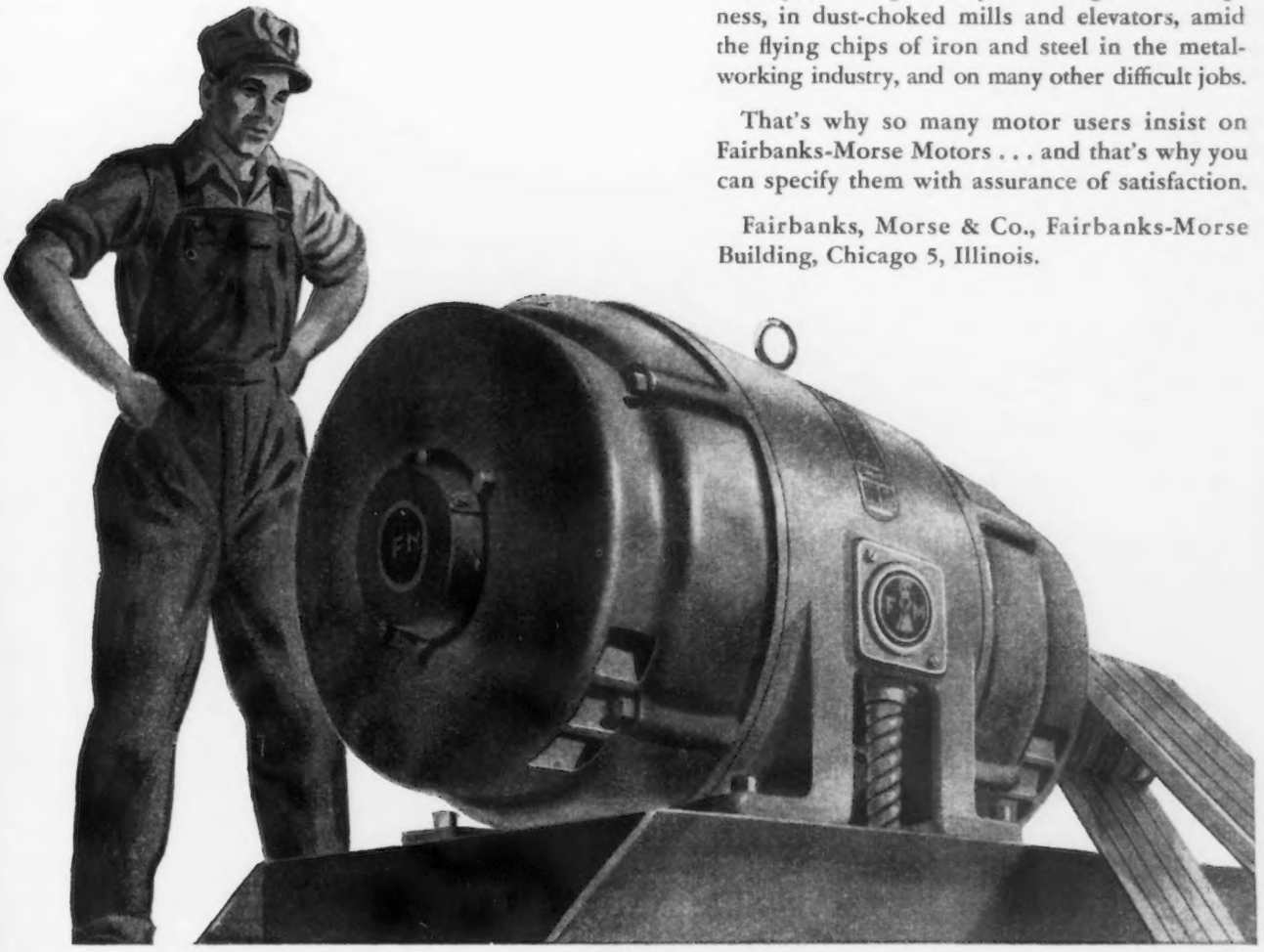
see Fairbanks-Morse FIRST FOR MOTORS

CONSTANT research and development have contributed many features which make Fairbanks-Morse Motors outstanding. Today, they are an accepted standard in industry.

They serve dependably in underground dampness, in dust-choked mills and elevators, amid the flying chips of iron and steel in the metal-working industry, and on many other difficult jobs.

That's why so many motor users insist on Fairbanks-Morse Motors . . . and that's why you can specify them with assurance of satisfaction.

Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.



Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines
Scales • Motors • Pumps • Generators
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment

Dear Editor:

HYDRAULIC PRESS MIXUP

Sir:

I have just received a tear sheet of the Dec. 27 issue, p. 63, containing an editorial mention of the new Colonial "Junior" hydraulic presses, and we note that you have used an illustration with this article which has nothing to do with the Colonial jobs.

It is rather disturbing to have this happen since the press apparently is of very crude design and hardly anything that Colonial Broach would put out. The difficulty is that some people will look at this page, note the heading and manufacturer, look at the illustration, and get an entirely wrong impression of the sort of thing that Colonial produces. Would it be possible for you to correct this in a coming issue, showing the correct illustration with the caption referring to the Dec. 27 issue?

ATHEL F. DENHAM
Denham & Co.,
Detroit 26

● This picture mixup is regrettable and we will rerun the Colonial item with the correct picture the next time we feature presses in our New Equipment pages.—Ed.

MULTIPLE SPINDLE DRILLING

Sir:

Please send us a reprint of "Time Allowances for Multiple Spindle Drilling" from the May 31 issue. Herewith enclosed is 15¢.

JAMES A. EDEN
146 Chestnut St.,
Springfield, Mass.

● Reprint has been forwarded.—Ed.

SETUP CHARTS

Sir:

We are enclosing 60¢ in stamps for which please send us a reprint entitled "Setup Charts for Automatic Screw Machines."

M. BOCKSTAHLER
Faultless Caster Corp.,
Evansville, Ind.

● Reprint has been mailed.—Ed.

PREFABRICATED HOUSES

Sir:

In the Dec. 27 issue, p. 95, I have noticed that certain prefabricated houses produced under lend-lease are available for sale to the United States public. Can you tell me which one of the some 1500 government departments I should contact to obtain more information on these houses?

T. O. HOLLAND,
Manager of Purchases
Ames Baldwin Wyoming Co.,
Parkersburg, W. Va.

● Only a few prefabricated houses have been declared available for sale to the public. For further information, communicate with the regional office of RFC at Cleveland.—Ed.

PRECISION CASTING

Sir:

We are enclosing 60¢ to cover the cost of the booklet entitled "Precision Casting."

B. H. RESNICK,
Sales Coordinator
Sherman & Co.,
New York 13

● Reprint has been sent.—Ed.

CASTING MACHINE INQUIRY

Sir:

We are in want of a pressure casting machine, that is to say, a machine capable of making castings under pressure. Therefore, we take the liberty to ask you whether you have, among the firms who advertise in your magazine, plants who would be in a position to supply such a machine. If so, we should thank you to kindly let us have the addresses of those works to whom we should apply to obtain prices, delivery time, catalog, and all information regarding the above machine.

MARCEL HONORE
9-13 Rue des Culots,
Fontaine-L'Eveque, Belgium

● We are mailing you a list of several companies.—Ed.

ATOMIC BOMB

Sir:

Kindly send us two reprints of the article "Atomic Bomb Sidelights." We are enclosing 20¢ in coin to cover the cost.

J. DE KADT
Briam Mfg. Corp.,
Brooklyn

● Reprints have been mailed.—Ed.

NICKEL SPOT TEST

Sir:

We will appreciate receiving a copy of the following article which appeared in your Sept. 13 issue: "Rapid Spot Test for Nickel in Steel" by E. R. Vance and H. S. Gonser.

THOMAS F. BRIEN,
Purchasing Engineer
Bausch & Lomb Optical Co.,
Rochester 2

● Tear sheets have been sent.—Ed.

RAILROAD BRIDGE

Sir:

On p. 84 of your Dec. 20 magazine, a picture is shown of a timber bridge which was built in place of the steel bridge blasted by the Germans during their retreat. This important bridge is on the main trunk line Praha (Prague)—Zilina near Vrutky (not Vuitkey).

I received word from the Vithovice Iron Works, Czechoslovakia, that there are orders on hand to repair or renew over 300 bridges in Slovakia and Moravia. The Vithovice Iron Works were the originators of the modernistic Czechoslovak Pavilion at the Worlds Fair. At the upper right hand corner of the picture, p. 84, you find two Czech greetings used mainly by miners—"Praci Cest," Honor to the work; and "Zdar Buh," Help God.

Thought this might interest you.

BERT ZENATY,
Member ASME
394 Burns St.,
Forest Hills, N. Y.

SPRAY GUN WEIGHT

Sir:

Referring to your article "Metallizing as a Production Process" appearing in the Dec. 13 issue, I wish to bring your attention to a correction as far as the matter of weight of the gun is concerned. The actual weight itself is slightly over 11 lb, whereas the 22 lb weight is the shipping weight, which of course includes the gun, the metal carrying case, the tools, and similar extras together with the packing case.

W. C. REID,
Vice-President
Metallizing Engineering Co., Inc.,
Long Island City, N. Y.

GERMAN STAINLESS STEELS

Sir:

Your article on "German Stainless Steels" by Alexander L. Feild in THE IRON AGE of Dec. 20 has proven very interesting and useful. Please advise as to how I may obtain a reprint or tear sheets.

NORMAN P. PINTO,
Assoc. Metallurgist
Metallurgical Laboratory,
Chicago 80

● Yours for the asking. Tear sheets have been mailed.—Ed.

KEY BOLT MANUFACTURER

Sir:

Are you able to give us the name of at least one manufacturer who makes key-bolts? We do not seem to have much success in locating such a maker, but we continue to believe there are such. The sizes ⅞ in. up to 1 in. or 1¼ in. interest us.

G. W. BORTON
Pennsylvania Crusher Co.,
Philadelphia 7

● We are forwarding you a list of several companies.—Ed.

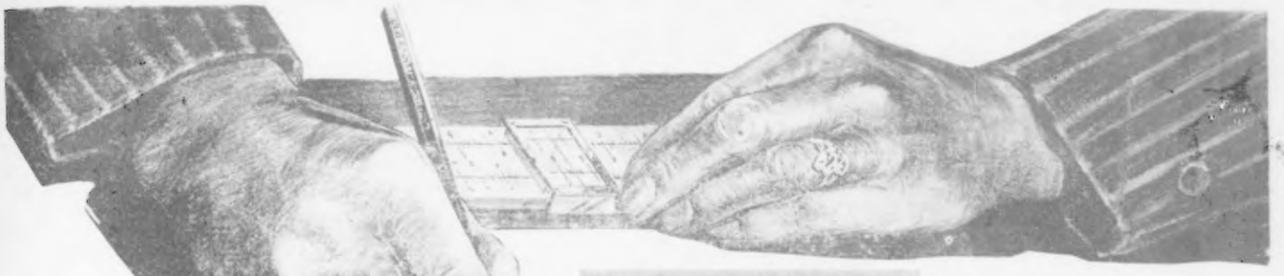
BERYLLIUM COPPER

Sir:

We should appreciate your forwarding us a copy of the article "Heat Treating Beryllium Copper for Peak Performance" by H. G. Williams, as found in the Dec. 6 issue.

DONALD F. MURPHY,
Mechanical Section
Friez Instrument Div.,
Bendix Aviation Corp.,
Baltimore 4

● Tear sheets have been forwarded, and reprints will soon be available.—Ed.



T and W Skilled Observation

FROM ENGINEERS TO OPERATORS of the largest presses, Transue has played the role of skilled observer in the production of deep drawn stampings. As each new advancement in stamping applications has progressed from the drawing board to the production line, it has been the subject for close study by T&W craftsmen. The resulting familiarity with elements of stamping know-how, such as draw limitations, metal flow, grain structure, die design, is responsible for superior accuracy, uniformity and finish of T&W parts.

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TRANSUE & WILLIAMS
ALLIANCE, OHIO

This Industrial Week . . .

- **Strike Calloff Given a 50-50 Chance**
- **Compromise Hinges on Price Increase**
- **Steel Ingot Output Down 7.5 Points**

IF steel industry leaders agree to expand the 15¢ an hr offer made last week by Benjamin F. Fairless on behalf of the U. S. Steel Corp. and if Philip Murray can see his way clear to reduce his 19½¢ an hr offer despite the automobile Fact-Finding Board recommendation, there will be no steel strike on Monday, Jan. 21.

These "IFS" are so big, however, that at mid-week there was no more than a 50-50 chance of another strike postponement. The possibilities of frayed nerves and Government mishandling of a complicated steel price problem loom large as a determining factor in the steel controversy outcome.

Some criticism of the U. S. Steel Corp.'s 15¢ an hr offer has been voiced unofficially by some steel companies, and it was to have been expected that the meeting held in New York early this week at which Mr. Fairless made his report to other steel company officials, would have its stormy moments.

On the other hand, Mr. Murray in taking an unprecedented step by postponing the steel strike, will be in an unenviable position late this week if a wage agreement is not in prospect. It is extremely doubtful whether a second postponement would be made under such circumstances.

IT was obvious this week that the Government is bluntly using a "promised" $4 a ton increase in steel prices as a club to force a wage agreement. This purported promise has become somewhat of a mystery in that OPA has in no way indicated its approval of a $4 increase, what products would be affected, and whether or not it would be an across-the-board increase.

From other Government sources, however, and from information permeating through the industry it has been indicated, unless changed before the week is out, that a straight across-the-board steel price adjustment of $4 or slightly more is in prospect when an if a wage settlement is made.

If such a price increase is granted, the problem of the nonintegrated steel mill will be more precarious than ever. A straight across-the-board advance would leave these smaller companies, which buy semifinished steel and process it into finished steel products, in the same position in which they are now. For several months these smaller units have been demanding that OPA take some kind of action to remove what they claim to be price inequities. Normal steel price action usually takes into account a differential between the price advance in semifinished steel and a price advance in finished steel products. On the basis of a 42 hr week in the steel industry at about the same level as current employment, it is estimated that a 15¢ an hr increase would cost the industry $148,000,000 a year in wages. A 19½¢ increase demanded by the steel union would cost about $193,000,000 a year. On the basis of 56,000,000 tons of finished steel, the approximate amount produced in 1945, a price increase of $4 a ton would net the steel industry about $224,000,000 a year.

SINCE the price increase was demanded to cover accumulated costs exclusive of any new wage agreement, a wage increase of 19½¢ an hr would leave little from a $4 ton advance in price. This is the reason why it is expected that the steel industry, after gaging the effects of a wage and price increase, over a period of operations, will likely request some sort of a subsequent price adjustment.

The slowdown in operations last week at many steel company plants in preparation for a strike has made itself felt this week, even though units were rushed back into production as quickly as possible. Steel ingot output this week is down 7½ points to 75.5 pct of capacity. Even though there is no strike next week, the industry may, in some areas, suffer the same type of a slowdown again by the end of this week.

Many companies covered by the steel union strike call are not producers of steel but are engaged in steel fabrication or further processing of steel products. Such companies are out on a limb in view of a probable $4 a ton increase in their raw material. Faced with being forced to give the same wage increase as the large producing steel companies because of their contracts, they will have to go through a lengthy process of appealing to OPA for price relief.

Throughout the entire steel wage-price controversy runs the feeling among many officials that expediency is the main factor in rushing through a settlement. These executives feel that such a mad scramble to effect a compromise will result later in price maladjustments and further wage demands. This segment of the industry is also mindful of the fact that the coal wage question may open up new trouble for the steel mills before April 1.

Despite the threat of a steel strike, the supply of scrap continues as tight as ever. Many companies have made arrangements to put scrap in storage in case their plants are shut down. In regaining operations after a probable strike period, the lack of scrap will place strong emphasis upon the ability of blast furnaces to supply enough hot metal for a quick resumption of steel output.

• **INGOT MOLD CONTROL SUSPENDED**—Cast iron ingot molds have been suspended from price control by OPA. In addition, the following mechanical building equipment items have been suspended: Steel body safety and relief valves; carbon and alloy steel pipe fittings except fittings and flanges less than 250 lb pressure; forged steel fittings except welding; carbon, alloy and forged steel valves; copper base alloy valves larger than 8 in.; steel, iron and bronze plug valves; steel turbine valves; cast iron pressure pipe and fittings.

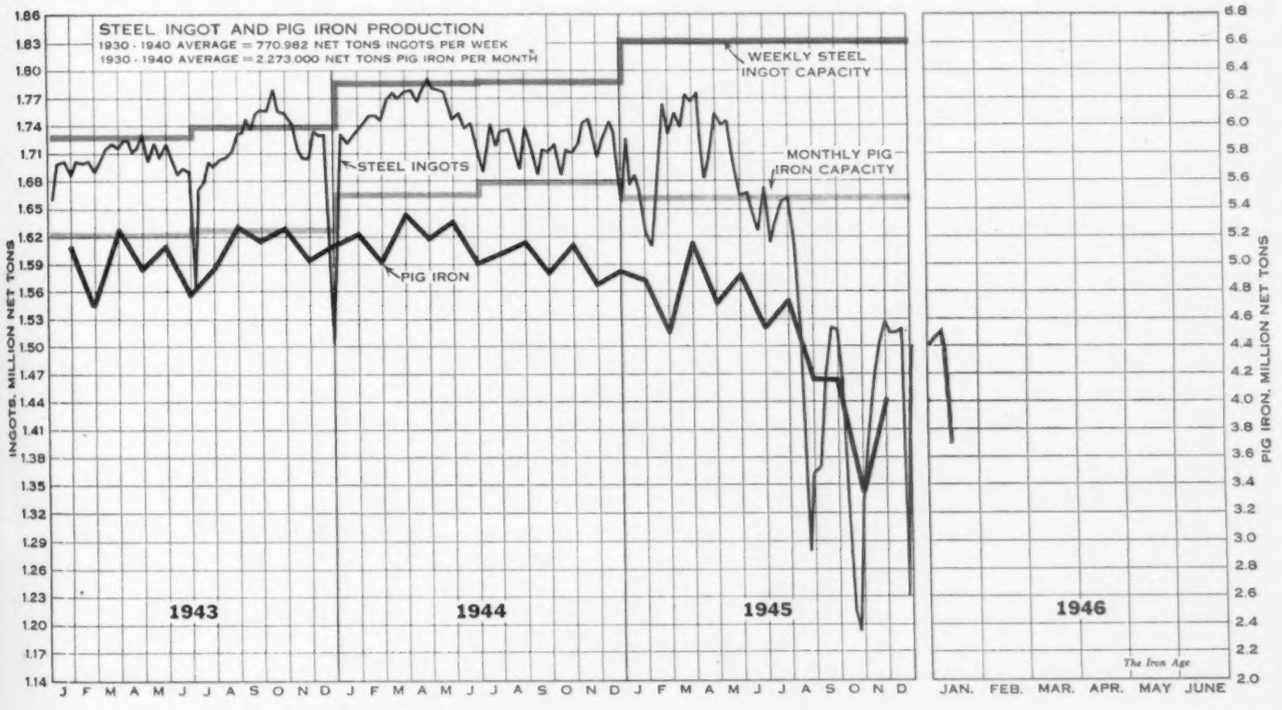
• **STEEL EMPLOYEES AND PAYROLLS**—Average employment, total payrolls and average hours of work in the iron and steel industry were higher in November than in October, says the American Iron & Steel Institute. The industry's November payroll totalled $122,796,800, compared to the October total of $121,258,100, and the November 1944 total of $143,136,800. The average number of employees in November was 532,600, against the October average of 521,700 and the November 1944 average of 564,200 persons. The average earnings of employees receiving hourly, piecework or tonnage wages was 122.0¢ in November, against 119.6¢ in October and 120.2¢ in November 1944. Wage earners worked an average of 41.9 hr per week in November, against 41.7 hr per week in October, and 47.7 hr per week in November 1944.

• **STEEL OUTPUT IN 1945 DOWN**—The steel industry produced 79,745,581 tons of ingots and steel for castings in 1945, according to the American Iron & Steel Institute. That tonnage, although well above the highest output of any peacetime year, was almost ten million tons below the record production of 89,641,600 tons established in 1944. The industry's average operating rate during 1945 was 83.5 pct of capacity, compared with 95.5 pct of capacity in 1944. Production during the first half of 1945 was only 2,000,000 tons below output of the corresponding part of 1944, but in the second half of 1945 due to the coal strike and reconversion it was down approximately 8,000,000 tons from the output of the latter part of 1944. Production in December was 6,084,929 tons, against 6,201,380 tons in November and 7,366,170 tons in December 1944.

• **U. S. STEEL SHIPMENTS**—Shipments of finished steel products by subsidiary companies of the United States Steel Corp. for December 1945, were 1,459,803 net tons. This compares with 1,346,407 net tons in November, an increase of 113,396 net tons, and with 1,767,600 net tons in December 1944, a decrease of 307,797 net tons. Shipments for the twelve months of 1945 were 18,484,277 net tons compared with 21,052,179 net tons in the comparable period of 1944, a decrease of 2,567,902 net tons.

• **STEELMAKING LABOR**—Orders to Britain from European countries are continuing to arrive in quantities large enough to overload mill books in Sheffield and elsewhere in the steel industry, and the labor shortage remains the primary limiting factor in British steel production. Despite the government's promises of greatly accelerated demobilization, industry everywhere reports that the men returning amount only to a trickle. Some mills report that production might be increased to six times its normal rate in finishing operations if labor were available.

• **COAL TO FRANCE**—Deliveries of coal to France from the Ruhr by British authorities are reported to be increasing, partly as a result of complaints lodged by the French government. Arrivals are said to be in the neighborhood of 20,000 gross tons per day, which if true, is somewhat more than the amounts agreed upon by the European Coal Organization. Although the increased deliveries are expected to improve the situation of French industry, the amounts are still not large enough to have a great effect on the status of production.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 8.....	78.0	88.5	84.0	81.5	84.5	98.0	85.0	95.0	98.5	58.0	93.0	70.0	112.0	83.0
January 15.....	72.0	71.0	79.5	70.0	80.0	67.0	80.0	92.0	98.5	58.0	93.0	70.0	112.0	75.5

* Revised.

The CONE AUTOMATIC MACHINE COMPANY
sees many
GOOD THINGS AHEAD

It is reported that . . . . . .

A technical magazine states that the war-developed arc-oxygen electrode will cut quarter-inch steel plate at the rate of a foot per second while under 40 feet of water. *Metal and Thermit Corp.*

get ready with CONE for tomorrow

It is estimated that within a few years 80% of the coal mined underground will be removed from the mines on conveyor belts instead of in cars. *Scientific American.*

get ready with CONE for tomorrow

The PV-3 helicopter has a long fuselage with a rotor on each end and carries twelve persons. It is being tested by the Coast Guard and Navy. *Popular Science.*

get ready with CONE for tomorrow

A new cement, for use in concrete flooring, is said to drive away insects, kill bacteria, and prevent the formation of molds. It also dissipates static electricity. *H. H. Robertson Co., Pittsburgh.*

get ready with CONE for tomorrow

An appliance manufacturer announces an electric washing machine that can also, by the use of attachments, wash dishes, peel potatoes, churn butter, and freeze ice cream. *Hurley Machine Division Elec. Household Utilities.*

get ready with CONE for tomorrow

A new gasoline-powered lawn mower resembles a floor scrubbing machine. It is mounted on four wheels and uses a rotary knife revolving at 3,000 r.p.m. *Whirlwind Lawn Mower Corp., Milwaukee.*

get ready with CONE for tomorrow

The manufacturer of the jet engine used in the P-80 Shooting Star prophesies that all transcontinental planes will be jet-propelled within five years. *General Electric.*

One of the war devices that may survive to help the motorist is the tire gauge that registers on the dash, developed for the Army's amphibious "duck." *GMC Truck and Coach Div.*

get ready with CONE for tomorrow

A magnetic survey of the state of Florida shows large areas in the southern part that are favorable for the occurrence of petroleum. *U. S. Dept. of Mines.*

get ready with CONE for tomorrow

Meals are being served in the Naval Air Transport Service that are pre-cooked, packed in a covered paper plate and frozen. On the plane they are thawed and heated in a special oven. *Maxon Sky Plate, W. L. Maxon Corp., 460 W. 34th St., New York.*

Air conditioned trolley cars are being introduced in a Southern city. This is said to be the first use of such equipment in city vehicle transportation. *Atlanta, Ga.-Pullman-Standard.*

get ready with CONE for tomorrow

A new household electric light switch can be set for delayed action up to three minutes. *T. J. Mudon Co., 1240 Merchandise Mart, Chicago.*

get ready with CONE for tomorrow

Rubber V-belts molded around a steel cable have been developed to replace chain drive on Army motorcycles. *Goodyear, Akron 16, Ohio, Whizzer Motor Co., Los Angeles.*

get ready with CONE for tomorrow

Even the common wire nail has been improved. The new type has a notch in place of the point and is claimed to be non-splitting. *E. S. Gair, Snyder, New York, inventor.*

15 operations
in 12 seconds

The 15 operations that form this washing machine part of B-1112 steel, including rolling the oil grooves in the outside diameter, are performed by the 3-Spindle Conomatic in 12 seconds.
Write to Cone for particulars

CONE
AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.
24

Possibility Looms That Steel Strike May Be Canceled

New York

By TOM CAMPBELL

• • • **The steel strike has** been postponed until 12:01 a.m. Jan. 21. It is better than a 50-50 chance that the strike will not occur. Main obstacle to such an optimistic note will be the divergence of opinion expressed by steel company heads other than Benjamin F. Fairless, U. S. Steel Corp. president.

Mr. Fairless met with other

o o o

steel company executives on Tuesday of this week and it takes no imagination to believe that the meeting had its fireworks. Several steel companies are known to have protested the corporation's offer of 15c an hr to the union.

Little realized is the fact that Mr. Murray and Mr. Fairless last Saturday departed from the usual pattern of action expected in such a tense situation as the steel-price-wage controversy. The union policy has usually been to precipitate a strike in order to show its strength, while the past policy of U. S. Steel has been to offer a small raise in an attempt to hold on to the vestige of negotiations.

Both of these policies were smashed by the attitude of the steel industry and labor union

Steel Labor Briefs

• **UNION DEMANDS**—Originally 25¢ an hr. Later reduced to 19.5¢. On a daily basis this is $2.00 and $1.56. Had it not been for the GM fact finding report coming when it did Mr. Murray last week may have given more ground.

• **COMPANY BID** — Apparently having offered a lower figure first U. S. Steel last week offered 15¢ an hr ($1.20 a day). Again at the White House on Saturday the same figure was advanced by Mr. Fairless, U. S. Steel head. Upping of this figure depends on what luck (or misfortune) Mr. Fairless has when he attempts to get other steel company heads in agreement.

• **UNION BACKGROUND**—Being an old hand at union setbacks Mr. Murray wants wages to keep up with cost of living figures in the years to come instead of trailing them as was the case from 1923 to 1929. The union claims steel companies can meet its demands and has not entered into the price angle nor has asked to see company books.

• **STEEL BACKGROUND**—Steel companies in the fourth quarter were at or near showing a loss in earnings. Price adjustments had been asked months ago but no definite action by the government was indicated until the wage question reached an impasse. The $4.00 a ton price increase promised will no more than take care of the union demand although the price adjustment was demanded to take care of accumulated costs over the past few years. When the wage increase is granted the steel industry will have to ask for an additional price increase.

• **WAGE HISTORY**—On Mar. 16, 1937, the steel common labor basic rate was raised from 52.5¢ an hr to 62.5¢; on Apr. 1, 1941 it was raised 10¢ an hr to 72.5¢; and on Sept. 1 1942 (retroactive to Feb. 16, 1942) the common labor rate was raised to 78¢ an hr where it stands now. Chances are that the final adjustment will mean about 17¢ an hr increase placing the common labor rate at the highest in steel history (in the prosperous year 1929 the rate was 50¢ an hr but in the depression it reached an "unofficial" low of 28¢ an hr).

• **WAGE INCREASE COSTS**—THE IRON AGE estimates that the wage bill of the steel industry, based on a 42-hr week, at an activity rate comparable with October and November 1945 would be as follows: If the wage increase were to be 15¢ an hr—$148 million annually; 16¢ an hr—$158 million; 17¢ an hr—$168 million; 18¢ an hr—$177 million; 19¢ an hr—$188 million; 19½¢—$193 million and 20¢ an hr—$198 million.

• **PRICE INCREASE**—If OPA allows a $4.00 a ton "across the board" increase for steel products THE IRON AGE estimates that on a basis of about 56 million tons of finished steel this would mean about $224 million annually. Output in 1946 may be lower. When the wage bill is subtracted from the price increase promised little will be left for the industry in view of taxes. For that reason the industry would have to ask for another price advance to take care of the wage hike.

• **WEEKLY WAGES**—The Ameri-Iron & Steel Institute says that steel workers as of January 1941 took home an average of $33.95 a week and in November 1945 received an average of $51.12 a week. This figure is only an average with actual earnings being both lower and higher. Breakdown figures showing the percentage of workers making so much a week by small increments has never been made public. In the 1930 depression National Industrial Conference figures indicated that steel take home earnings for 1932 averaged about $12 to 13 a week while in 1934 average weekly take home pay rose to between $14 and $15 a week.

• **STEEL PRICES**—In 1936 and in 1937 the industry was able to advance prices to make up for the lows encountered in the depression years. However in 1938 competition took the prices down again and when prices were frozen by the OPA the level of steel prices was rock bottom. Little advances have been made since that time. Steel prices today are not far above 1936 levels but wage costs are phenominally higher. Average wage cost (total wages paid divided by hours worked) in 1936 was around 65¢ an hr and in 1941 it was 85.9¢ an hr but in November 1945 the average wage paid (not the common labor rate) was $1.22 an hr. This latter figure is a few cents higher than actual because of retroactive wage adjustments for shift differential payments and accrued vacation allowances.

leaders, during the short period when both were under pressure to reach an agreement. President Truman, it can be said, probably accentuated a feeling of potential agreement when he insisted the two men meet at the White House and that the steel strike be postponed.

Both parties this week were only 4½c an hr apart on their demands. It is expected that barring unusual pressure from the rest of the industry, Mr. Fairless may give a better offer which would be followed by a reduction in Mr. Murray's demands.

That a difference of 4½c an hr would be used to precipitate a national steel strike, which would wreck the reconversion effort in the country, is hardly conceivable now that both parties have exhibited an unlooked-for amount of national statesmanship. For that reason even if a steel strike becomes an actuality it will not last long, because it is known that both the union and the steel companies want to clean up their labor controversy as soon as possible. This is in direct contrast with the attitude of a month ago when both sides were hurtling towards a showdown without respect to public reaction.

Mr. Fairless had much at stake during his serious negotiations with Mr. Murray. He went into the meeting with no more than a promise that OPA would allow a $4 a ton across-the-board increase in steel prices. This adjustment was to make up for what in the fourth quarter will indicate one of the lowest returns in earnings for such a high period of activity in U. S. Steel Corp.'s history. There was no way of knowing whether or not the OPA would renig at the last moment as they have done before. Yet an offer by Mr. Fairless of 15c an hr was made before any price increase was made official.

Mr. Murray took a chance of losing face when he postponed the steel strike. With a five-to-one vote for a strike and with steel workers straining at the bit it took something, not generally exhibited by union officials, to call off the strike. Never in the history of the steel union has such restraint been shown. It augurs well for a substantial boost in management-union negotiations after the present impasse has been removed.

The attitude on the part of the steel union is in direct contrast with the CIO-UAW. In that case it is believed that a premature strike was called and that Mr. Murray had intended that the steel strike call should be the major pivot upon which CIO disputes would be settled. He is too loyal to his officials to make any public or off-the-record statement regarding this situation, but it takes little brains to figure out that the automobile strike was called at the worst possible time from the union standpoint. Furthermore, the UAW's attitude upon ability to pay and a request for a scrutiny of the company's books boomeranged to the detriment of the automobile union. No such demands were made by the steel union which has contended that steel prices and steel company books are a matter between the steel companies and the OPA.

It is expected that steel production this week will be down several points because many companies, at least in the U. S. Steel Corp. group, were late resuming operations after having prepared for a strike shutdown. It is also possible that if no agreement on wages appears before the end of this week, steel output will again drop off as companies take measures to protect their equipment.

Some steel plants were idle early this week because of a "gun jumping" stoppage last Saturday, notably Bethlehem Steel's Lackawanna, N. Y., plant, Jones & Laughlin's Aliquippa, Pa., pipe works and Rotary Electric Co.'s plant in Detroit. These strikers are expected to be back at work before the week ends.

One factor in the turn taken by the steel labor controversy may be that both sides have been forced to realize that their measure was being taken by the public. Pertinent background on the entire steel price-wage problem can be found in the table accompanying this article.

STANDING BY: *Having submitted its verdict regarding the steel dispute, the Fact-Finding-Board is awaiting the outcome. Left to right, are Associate Justice R. I. McDonough, Utah Supreme Court; N. P. Feisinger, steel panel member; Chief Justice J. N. Douglas of the Missouri Supreme Court*

Army Returns Ford Plant

Dearborn, Mich.

• • • **The Army has** returned to the Ford Motor Co. the New Orleans plant leased at the start of the war for use as a storage depot. Ford will again use the building as a parts depot, with normal operations to begin within three months, with the depot supplying passenger car and truck parts to dealers and owners in Louisiana, Alabama and Mississippi.

Uncertainty in Steel Impasse Continues As Strike Is Postponed

Washington

• • • **Uncertainty of** the outcome still prevailed on the eve of United States Steel Corp.-CIO-USW wage negotiations as they were about to be resumed at the White House on January 9. When they broke up on January 12, B. F. Fairless, president of the steel corporation, and Philip Murray, president of USW, had reached an impasse despite efforts of intervening government officials, acting for President Truman, to effect a settlement. Postponement of the steel strike by Murray from Jan. 14 to Jan. 21 was ordered after an appeal by the President, who is extremely anxious to avoid work stoppage in the industry. Settlement of the dispute in steel, because it is a key industry, is keenly desired by the Administration in the belief that it would result in easy settlement of other big industry-labor disputes with which the government is bedeviled.

The President had short separate conferences with both Mr. Fairless and Mr. Murray before the negotiations here broke down, emphasizing his anxiety that a steel strike be averted. After it was agreed to meet again "under the auspices of the President," Mr. Truman expressed the belief that an agreement will be reached, a view that was apparently not fully shared either in industry or union circles.

The President said that Mr. Fairless made a wage increase offer on behalf of the steel corporation and that Mr. Murray submitted a counter proposal. The President did not say what the specific offers were, but it was reported that they were the same as those made at negotiations on January 11 in New York, whose collapse prompted the President to call Mr. Fairless and Mr. Murray to the White House to continue them.

It was reported that Mr. Fairless had conferred with other steel companies in preparation for renewed negotiations but there were no signs prior to the resuming of the conference that he had changed his position. President Truman, it is understood, may attend the January 16 meeting and exert his powerful influence to bring about a settlement of the controversy. It is reported that the President again will have his representatives at the meeting. They are John W. Snyder, Director, Office of War Mobilization and Reconversion; John Steelman, special assistant to the President; and Secretary of Labor Lewis B. Schwellenbach. Government sources are placing strong hopes on Presidential pressure to settle the controversy.

Meanwhile, OPA defeated in its effort to limit steel price increases to $2.50 a ton, remains silent, until it gets the go-ahead signal from OWMR which is reported to have received the President's approval for a price increase of $4 or $4.50 a ton.

STATESMANSHIP: *Regardless of the outcome of wage negotiations Benjamin F. Fairless, U. S. Steel Corp. president and Philip Murray, steel union head, broke with past precedent in their last minute negotiations which were to be continued this week in Washington. Mr. Fairless made a "healthy offer" of 15c per hr, far greater than any previous offer made in past labor negotiations, while Mr. Murray departed from past precedent in postponing the steel strike practically on the eve of its inception.*

Steel Price Increase Renders Hardship On Nonintegrated Mills

T. E. Lloyd

Pittsburgh

• • • **One of the major** fallacies of the present steel wage-price negotiations is that an "across-the-board" increase in steel prices will solve cost problems of all companies required by the CIO-United Steel Workers of America to meet its demand for a $2 a day wage increase. In fact, an across-the-board price increase, pegged at around the $4 a ton by President Truman, will work in reverse for all except the fully integrated steel companies.

The fully integrated steel mills, in gaining a $4 a ton price increase, will be able to offset some losses of high cost products by a better profit margin on the items of lower cost. However, such mills represent only about one-third of the employment that is covered by the CIO-USWA wage demands. According to the Bureau of Labor Statistics, there were some 1,191,000 production workers employed in the manufacture of iron, steel, and products of these metals on Oct. 15, 1945, of which number some 970,000 were CIO members. At that time, between 410,000 and 420,000 were employed directly in the blast furnaces, steel plants and rolling mills of steel producing companies. This leaves about 700,000 workers employed in plants that buy steel products from steel mills and further fabricate them.

Some such plants are: Cast iron pipe and fittings shops, employing 13,800; 27,800 in wire mills using purchased rods; 28,300 in wire processing plants using purchased wire; 60,500 in plants that produce stampings, porcelain enameled and galvanized products; 41,300 in structural fabricating and ornamental iron shops; 25,700 in iron and steel forge shops; 13,800 in plants manufacturing wrought, welded and riveted pipe made from purchased steel; and 5300 in plants manufacturing steel barrels, kegs and drums from purchased flat-rolled material.

Thus, in addition to the wage increase of $2 a day per employee, these nonintegrated and independent finishing mills will have to absorb an additional cost of about $4 a ton for the iron and steel that is purchased to make the products in which they specialize. Of course, the price increase as such will be passed along to the end consumer by these manufacturers, but many are of the opinion that added costs will far outweigh the $4 a ton to be gained from the price increase. For example, a cold-roller sheet producer may only get a 70 to 80 pct yield from hot-rolled stock purchased. Further, it is axiomatic in steel production that labor costs increase at a faster rate as finishing operations become more complex. In other words, proportionately more manhours are consumed in making a ton of tinplate or fine wire than in the production of the material from which these items are produced, namely hot-rolled sheet or wire rods.

This all boils down to a fact that has been apparent to the small producer. The nonintegrated mills that buy skelp, hot-rolled sheet and strip, hot-rolled bars, wire rods, slabs and other such products and plants such as foundries that buy pig iron, estimate that the suggested across-the-board price increase in steel plus any wage adjustment will boost their costs far above what can be gained from the price increase alone.

One nonintegrated mill in this area that rolls cold-rolled sheet and strip from hot-rolled stock estimates that a $4 a ton general steel price increase and a $2 a day wage increase will result in a direct loss to the company of between $2 and $3 a ton on their finished products. With the yield on their purchased stock running about 75 pct, higher labor costs resulting from a wage increase, higher raw material costs, and other cost factors that will result directly from the consummation of present negotiations, actual costs for this company's output will be increased $6 to $7 a ton, of which the $4 a ton price increase can be recovered.

Under the present price increase proposition, plants that employ less than 33 pct of those workers affected by CIO demands will benefit from the higher steel price, since not all of the basic steel plants are completely integrated. Plants that employ the remainder, over 700,000, will find that instead of being benefited by a steel price increase they will be caught between high labor costs and high material costs, the latter not being adequately covered by their own product price increase. These plants that make up better than two-thirds of the employment in the industry and purchase about 20 pct of the steel produced by the integrated mills are facing a threat to their very existence.

The effects of such an action were shown in a mild way by the price increase granted last summer. While not exactly a parallel, the $2 a ton increase granted by OPA on the price of hot-rolled sheets cost one company in this area about $500 000 a year. The company purchased hot-rolled stock and then cold reduced it. On the latter commodity no price increase was granted. On an annual production of about 250,000 tons of cold-rolled material, this company found that its costs had mounted $500,000 a year.

Steel Strike Will Find Warehouses Unable To Accommodate All Users

Chicago

• • • **Large scale steel** consumers who will be turned away from normal mill sources in case of a strike generally will receive small encouragement and little steel from steel warehouses not affected by a possible strike.

Early indications that the Civilian Production Administration was prepared to freeze warehouse stocks when the strike signal was given were discounted last week, and it appears that the warehouses will be allowed to distribute their meager inventories as they see fit.

Few of the warehouses, whose steel rationing system has been very informal because of their large number of customers, have any cut and dried formula for taking care of steel users seeking shelter from the strike. Emergency cases will be given special attention, but the strike, if it occurs, will not be considered an emergency.

This means that mass production industries will not be able to depend on the warehouses as an alternate source to keep assembly lines going as their own inventories run out. Some warehouses are willing to supply single bottleneck items, aggregating minor tonnage, when stocks permit.

Even if the warehouses were willing to shoulder a major share of the steel supply burden, their stocks since VJ-Day have been spotty, with many items almost entirely exausted. Light gage sheets and strip, galvanized sheets, small shapes, and some bar sizes have virtually disappeared from most distributors' inventories. These are the same items which have been tight and extended on mill delivery schedules.

Still prominent in the memories of the distributors are the early days of the war when a rush of business from buyers unable to secure prompt mill delivery turned to the warehouses with the result that many became bare as a ballroom and had to wait months to replenish stocks. The warehouses have no intention of selling themselves out of business due to mill strike conditions, because, like consuming customers, they must wait in line for stock replenishment when the mills resume operations.

RFC Offers Plant for Sale

Washington

• • • **RFC is offering** for sale or lease the armor steel casting plant in Pittsburgh operated by the Blaw-Knox Co., and shell machining plant in Williamsport, Pa., operated by the Rheem Mfg. Co.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1945

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
February	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
March	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,947	4.43
1st Quarter	*19,364,034*	*93.3*	*1,124,640*	*77.6*	*1,080,103*	*80.2*	*21,568,777*	*91.6*	*1,677,199*	*12.86*
April	6,541,097	94.4	372,952	77.2	377,877	84.1	7,291,926	92.8	1,699,750	4.29
May	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4.43
June	6,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,594,939	4.29
2nd Quarter	*19,333,940*	*92.1*	*1,154,859*	*78.8*	*1,097,169*	*80.6*	*21,585,968*	*90.6*	*1,659,183*	*13.01*
1st 6 Months	*38,697,974*	*92.7*	*2,279,499*	*78.2*	*2,177,272*	*80.4*	*43,154,745*	*91.1*	*1,668,139*	*25.87*
July	6,318,463	88.6	381,832	76.7	286,713	61.9	6,987,008	86.3	1,580,771	4.42
August	5,171,925	72.3	347,088	69.5	217,363	46.9	5,736,376	70.7	1,294,893	4.43
September	5,435,358	78.7	352,847	73.2	195,156	43.5	5,983,361	76.3	1,397,982	4.28
3rd Quarter	*16,925,746*	*79.9*	*1,081,767*	*73.1*	*699,232*	*50.9*	*18,706,745*	*77.8*	*1,424,733*	*13.13*
9 months	*55,623,720*	*88.3*	*3,361,266*	*76.5*	*2,876,504*	*70.4*	*61,861,490*	*86.6*	*1,586,192*	*39.00*
October	5,146,370	72.0	242,122	48.5	209,290	45.1	5,597,782	69.0	1,263,608	4.43
* November	5,640,850	81.5	358,664	74.2	201,866	44.9	6,201,380	78.9	1,445,543	4.29
† December	5,546,152	77.7	344,092	69.1	194,685	42.1	6,084,929	75.2	1,376,681	4.42
† *4th Quarter*	*16,333,372*	*77.0*	*944,878*	*63.8*	*605,841*	*44.1*	*17,884,091*	*74.3*	*1,361,042*	*13.14*
† *2nd 6 months*	*33,259,118*	*78.4*	*2,026,645*	*68.5*	*1,305,073*	*47.5*	*36,590,836*	*76.0*	*1,392,875*	*26.27*
† Total	71,957,092	85.5	4,306,144	73.3	3,482,345	63.8	79,745,581	83.5	1,529,451	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,614,338 net tons open hearth, 112,658 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,636 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 84,171,590 net tons, Bessemer 5,874,000 net tons, Electric 5,455,890 net tons.

YEAR 1944

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,770,423	97.2	439,551	85.4	382,629	84.4	7,592,603	95.7	1,713,906	4.43
February	6,410,914	98.5	409,781	85.2	373,314	88.1	7,194,009	97.0	1,737,683	4.14
March	6,977,466	100.1	455,368	88.5	393,423	86.8	7,826,257	98.6	1,766,649	4.43
1st Quarter	*20,158,803*	*98.6*	*1,304,700*	*86.4*	*1,149,366*	*86.4*	*22,612,869*	*97.1*	*1,739,451*	*13.00*
April	6,789,422	100.6	437,472	87.8	366,794	83.5	7,593,688	98.8	1,770,090	4.29
May	6,879,253	98.7	437,444	85.0	385,879	85.1	7,702,576	97.1	1,738,730	4.43
June	6,463,049	95.8	419,699	84.2	351,509	80.1	7,234,257	94.1	1,686,307	4.29
2nd Quarter	*20,131,724*	*98.4*	*1,294,615*	*85.6*	*1,104,182*	*82.9*	*22,530,521*	*96.7*	*1,731,785*	*13.01*
1st 6 months	*40,290,527*	*98.5*	*2,599,315*	*86.0*	*2,253,548*	*84.7*	*45,143,390*	*96.9*	*1,735,617*	*26.01*
July	6,743,812	96.6	415,543	80.9	339,032	74.6	7,498,387	94.3	1,696,468	4.42
August	6,715,835	95.9	429,672	83.5	353,406	77.6	7,498,913	94.1	1,692,757	4.43
September	6,501,944	96.1	398,058	80.1	335,109	76.2	7,235,111	94.0	1,690,446	4.28
3rd Quarter	*19,961,591*	*96.2*	*1,243,273*	*81.5*	*1,027,547*	*76.2*	*22,232,411*	*94.1*	*1,693,253*	*13.13*
9 months	*60,252,118*	*97.7*	*3,842,588*	*84.5*	*3,281,095*	*81.8*	*67,375,801*	*96.0*	*1,721,405*	*39.14*
October	6,860,921	98.0	420,105	81.6	339,859	74.7	7,620,885	95.6	1,720,290	4.43
November	6,572,454	97.0	403,908	81.0	302,357	68.6	7,278,719	94.3	1,696,671	4.29
December	6,678,460	95.6	373,322	72.7	314,388	69.2	7,366,170	92.6	1,666,554	4.42
4th Quarter	*20,111,835*	*96.9*	*1,197,335*	*78.4*	*956,604*	*70.8*	*22,265,774*	*94.2*	*1,694,503*	*13.14*
2nd 6 months	*40,073,426*	*96.5*	*2,440,608*	*80.0*	*1,984,151*	*73.5*	*44,498,185*	*94.2*	*1,693,878*	*26.27*
Total	80,363,953	97.5	5,039,923	83.0	4,237,699	79.0	89,641,575	95.5	1,714,644	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,223,610 net tons, Bessemer 6,074,000 net tons, Electric 5,350,880 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,580,042 net tons open hearth, 116,182 net tons Bessemer and 102,757 net tons electric ingots and steel for castings, total 1,798,981 net tons; based on annual capacities as follows: Open hearth 82,604,600 net tons, Bessemer 6,074,000 net tons. Electric 5,372,150 net tons.

* Revised.
† Preliminary figures, subject to revision.

Alcoa Grants RFC Royalty Free Patent Rights in Bauxite Extraction

Washington

• • • **Peace has been made** between the Aluminum Co. of America and the government in the row regarding the free use of all of the company's patent rights for extracting alumina from bauxite.

Surplus Property Administrator W. Stuart Symington on Jan. 10 announced that the company had granted RFC these rights and hailed the agreement as "clearing the way for competition in the industry." He was joined in rejoicing over the settlement by Attorney-General Tom C. Clark and Senator Joseph C. O'Mahoney. The Senator's Surplus Property Subcommittee of the Military Affairs Committee has been holding hearings on the aluminum problem.

RFC is granted the right to sublicense the patents to lessees of government owned plants, and under this arrangement the Reynolds Metals Co. will take over operation of the government owned Hurricane Creek plant, which has an annual capacity of 1,555,000,000 lb of alumina.

Terms have been agreed upon between RFC and Reynolds and the leases will be signed shortly, Mr. Symington said.

The patent agreement makes alumina available for smelting into aluminum, not only for the government owned Jones Mills smelting plant in Arkansas, which Reynolds is also leasing, but also for the three government owned smelting plants in the Pacific Northwest, as well as other smelters of the metal.

The three Pacific Northwest plants are the plants at Spokane, Wash., and Troutdale, Ore., both formerly operated by Alcoa but now surplus, and the surplus plant formerly operated by Olin Industries at Tacoma, Wash.

At the meeting Symington made public a letter to him from Arthur V. Davis, chairman of Alcoa. Davis, recalling that Alcoa had spent millions of dollars and years in research on the developments of these patents wrote:

"Except for the public considerations which you have presented to us so effectively, we would not consider a royalty-free license under such a valuable asset. However, we are glad to accede to these considerations and, if by so doing we have contributed in any substantial way to the solution of the complex problems of surplus property disposal confronting the Congress, the Surplus Property Administration and other governmental agencies, we are well repaid."

In reply, Symington wrote:

"If in the past I have had occasion to be critical of the Aluminum Co. of America, today's action on your part demonstrates to my complete satisfaction that your company, no less than the government agencies concerned, is moving constructively toward the solution of the problems which confront the Surplus Property Administration, the aluminum industry, and the country as a whole."

Reynolds will lease the Hurricane Creek alumina plant and the Jones Mills aluminum plant under the following terms, upon which Reynolds and RFC had tentatively agreed, subject to the patents being made available:

Jones Mills Aluminum Plant—The lease is for 5 yr with rental as follows: First year, $534,800; second year, $668,500; third year, $802,200; fourth year, $935,900; fifth year, $1,069,600. Reynolds pays all taxes, insurance and ordinary upkeep.

The lessee has an option to buy the plant. This option right expires six months before the lease expires.

Reynolds is leasing but half of this plant, the reason being that the half leased has cheap power, supplied by government owned generating equipment.

Hurricane Creek Alumina Plant—The lease is for 5 yr with rental predicated on 25 pct capacity operations as follows: First year, $273,000; second year, $341,000; third year, $409,000; fourth year, $478,000; fifth year, $546,000.

As operations go up, rents go up in proportion. As an illustration, if Reynolds operates this plant at full capacity, the rent for each will be four times the above figures.

Reynolds agrees to sell alumina at cost plus 6 pct but in no event more than $40 per ton. They agree to sell alumina to any purchaser, but their plants and government owned plants which are leased or sold to others, shall have a preference on supply of alumina.

Reynolds also agrees to enter into no alliance as to pricing policy, etc., with any other producer of aluminum or alumina.

COMING EVENTS

Jan. 21-23—1946 Convention of Institute of Scrap Iron & Steel, Inc., Congress Hotel, Chicago.

Feb. 4-7—National Meeting, American Welding Society, Hotel Cleveland, Cleveland.

Feb. 4-8—National Metal Exposition, Public Auditorium, Cleveland.

Feb. 4-8—National Metal Congress, Public Auditorium, Cleveland.

Feb. 4-8—American Society for Metals, Statler Hotel, Cleveland.

Feb. 4-8—National Meeting, Iron and Steel Institute of Metals Div., American Institute of Mining and Metallurgical Engineers, Statler Hotel, Cleveland.

Feb. 6-8—American Industrial Radium and X-ray Society, Hollenden Hotel, Cleveland.

Feb. 25-28—Annual Meeting, American Institute of Mining and Metallurgical Engineers, Chicago.

Feb. 25-Mar. 1—Spring Meeting, American Society for Testing Materials, Hotel William Penn, Pittsburgh.

Apr. 2-5—Packaging Exposition, sponsored by American Management Assn., Public Auditorium, Atlantic City, N. J.

Apr. 3-5—SAE National Aeronautical Meeting, Hotel New Yorker, New York.

Apr. 8-12—ASTE Exposition, Cleveland Public Auditorium, Cleveland.

Apr. 11-13—Spring Congress, Electrochemical Society, Inc., Birmingham, Ala.

Apr. 25-26 — Twenty-ninth AIME Annual Open-Hearth Steel and Blast Furnace and Raw Materials Conferences, Chicago.

May 29-31 — Machine Dealers National Assn., national convention, Claridge Hotel, Atlantic City.

June 3-5—American Gear Manufacturers Assn., Annual Meeting, The Homestead, Hot Springs, Va.

June 24-28—Forty-ninth Annual Meeting, American Society for Testing Materials, Buffalo.

Republic Concurs With ICC Reduction in Coal Rate from Co. Mines

Washington

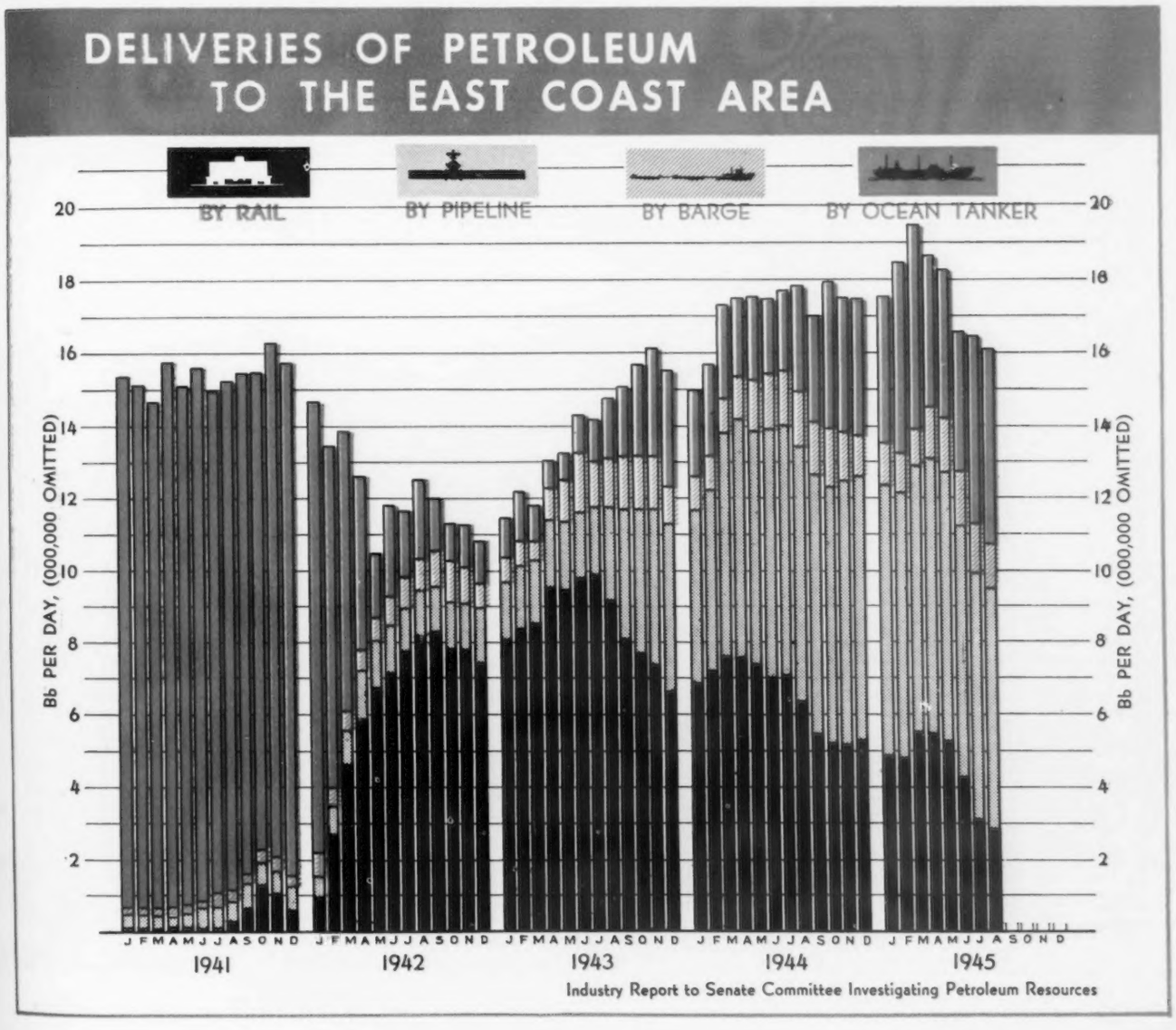
• • • **In an answer** filed last week with the Interstate Commerce Commission, the Republic Steel Corp., upheld the Commission's order reducing to $1.32 per net ton the rate on bituminous coal from the company's mines at Indianola and Russellton, Pa., to the Youngstown district. Railroads in a petition for reopening of the case in which the Commission ordered reduced coal rates from Western Pennsylvania mines to the Youngstown district, had charged that the Russellton and Indianola mines had been given special treatment.

Indianola is the most remote point from Butler, Pa., on the Bessemer & Lake Erie at which an operating mine is located. The only mines in the Freeport district other than those located on the Bessemer & Lake Erie, the Republic reply said, are those located on the Unity Railway Co. The effect, therefore, of the prescription of the $1.32 rate from Indianola and Russellton, it was pointed out, is to accord that rate to all the Freeport district mines located on the B&LE.

It was declared that the Commission quite properly was influenced in arriving at its determination that Freeport district mines on the B&LE should be accorder a lower rate basis than mines in the Pittsburgh district because of the heavy loading of bituminous coal from the Republic's mines at Russellton and Indianola compared with the average carloading of coal from the Pittsburgh district.

Replying to another charge, Republic said that the Commission has inaugurated no policy of making special rates for individual shippers. The effect of the Commission's order, it was declared, is to prescribe a rate of $1.32 from all mines in the Freeport district, Indianola and north, and not to restrict the rate to Republic's mines.

HOW GOES OIL: *Big Inch and lesser pipelines built for war emergency use will be eclipsed by older transportation methods—rail and tanker. Disposal of the new T-2 type tanker fleet is of vital concern not only to the oil industry but to shipbuilders as well.*



CED Sees Employment at Highest Peacetime Level

New York

• • • **Employment in this** country today is at the highest peacetime level in our history, despite current labor-management disputes. Approximately 52 million workers are now holding productive civilian jobs, and unemployment is only a fraction of that officially predicted at the conclusion of hostilities with Japan. This reflects more rapid reconversion than anticipated. In many areas reconversion is 90 pct complete.

Payrolls and individual earnings, which turned downward immediately after Japan surrendered, are now only slightly below wartime peaks and rising. Production of civilian goods is now 50 to 75 pct above July, 1945, levels and is expanding rapidly.

These are the highlights of a summary of the nation's business and employment conditions, released recently by Paul G. Hoffman, chairman of the Committee for Economic Development and president of the Studebaker Corp. Mr. Hoffman's statement was based on reports from government sources and on data submitted by the CED regional managers who met here to report on progress of reconversion and production expansion in the areas which they serve.

With 52 million workers employed in productive jobs as the year closed, the number of unemployed was only about 2,000,000 judging from official figures of the U. S. Census Bureau, he stated. The Census Bureau had estimated that unemployment in November was 1,710,000; in October, 1,550,000; and in September, 1,650,000.

"Even though production of peacetime goods is now at an all time high, it must be expanded further if we are to achieve our employment goal. Jobs must be provided for several million still to come out of the armed services. Once we have attained a satisfactory employment situation after reconversion and demobilization have been accomplished we must devote our full energies to maintaining it. It is one thing to attain a high level of employment; it is another thing to maintain it," Mr. Hoffman said.

Some of the highlights on the progress of reconversion throughout the nation as reported by the

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period NOVEMBER - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	51	1	xxxx	xxxx	xxx	328,545	163,991	xxxx	xxx	6,504,358	1,985,918
Structural shapes (heavy)	11	2	9,580,550	326,802	44.0	323,958	xxxx	3,222,006	39.0	3,217,582	xxxx
Steel piling	4	3		19,856		16,692	xxxx	199,961		196,547	xxxx
Plates (sheared and universal)	27	4	17,841,320	420,760	28.7	393,601	26,983	6,772,335	41.5	6,624,107	510,339
Skelp	6	5	xxxx	xxxx	xxx	55,221	20,707	xxxx	xxx	682,240	344,166
Rails—Standard (over 60 lbs.)	4	6	3,669,000	201,545	66.8	189,897	xxxx	2,064,819	61.5	2,033,633	xxxx
—All other	5	7	512,000	13,164	31.2	14,310	xxxx	153,061	32.7	156,398	xxxx
Splice bars and tie plates	12	8	1,745,960	61,568	42.9	63,739	xxxx	699,311	43.8	721,684	xxxx
Track spikes	10	9	349,400	14,805	51.5	14,309	xxxx	144,688	45.2	149,281	xxxx
Hot Rolled Bars—Carbon	38	10	xxxx	661,587	xxx	523,304	73,543	7,663,215	xxx	6,093,660	943,282
—Reinforcing—New billet	13	11	xxxx	87,436	xxx	86,904	xxxx	656,002	xxx	668,017	xxxx
—Rerolled	14	12	xxxx	7,719	xxx	8,712	xxxx	72,073	xxx	78,802	xxxx
—Alloy	25	13	xxxx	176,674	xxx	144,392	11,726	2,474,243	xxx	1,821,388	209,544
—TOTAL	46	14	22,381,700	933,416	50.7	763,312	85,269	10,865,533	53.0	8,661,867	1,152,826
Cold Finished Bars—Carbon	23	15	xxxx	111,708	xxx	105,883	xxxx	1,520,705	xxx	1,505,384	xxxx
—Alloy	25	16	xxxx	19,257	xxx	16,981	xxxx	347,702	xxx	310,335	xxxx
—TOTAL	32	17	3,015,910	130,965	52.8	122,864	xxxx	1,868,407	67.7	1,815,719	xxxx
Tool steel bars	17	18	273,010	8,117	36.1	8,116	xxxx	114,409	45.8	114,256	xxxx
Pipe & Tubes—Butt weld	16	19	2,232,520	124,005	67.5	126,938	xxxx	1,416,083	69.3	1,394,359	xxxx
—Lap weld	9	20	830,200	37,507	54.9	34,704	xxxx	462,495	60.9	473,838	xxxx
—Electric weld	11	21	1,570,900	73,889	57.2	62,048	xxxx	912,884	63.5	807,100	xxxx
—Seamless	16	22	3,377,700	209,452	75.4	180,595	xxxx	2,617,018	84.7	2,085,950	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	8,563	xxxx	xxxx	xxx	80,350	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	41,091	xxxx	xxxx	xxx	620,881	xxxx
Wire rods	27	25	7,266,670	382,029	63.9	108,314	34,250	4,129,672	62.1	1,198,448	411,054
Wire—Drawn	41	26	5,664,690	292,048	62.7	169,777	9,962	3,207,855	61.9	1,896,019	107,764
—Nails and staples	19	27	1,253,360	53,309	51.7	52,623	xxxx	549,472	47.9	552,838	xxxx
—Barbed and twisted	15	28	539,610	19,881	44.8	20,882	xxxx	215,859	43.7	215,843	xxxx
—Woven wire fence	16	29	1,113,860	32,743	39.0	35,879	xxxx	341,604	33.5	339,753	xxxx
—Bale ties	12	30	149,700	6,631	53.8	7,145	xxxx	68,392	49.9	72,860	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	85,038	721	xxxx	xxx	549,948	4,803
—Chemically treated	8	32	465,000	13,971	36.5	11,576	xxxx	113,917	26.8	102,626	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,793,850	142,357	45.6	141,226	xxxx	1,832,201	52.8	1,914,942	xxxx
—Electrolytic	10	34	2,231,850	67,368	36.7	67,445	xxxx	807,716	39.5	797,904	xxxx
Sheets—Hot rolled	30	35	19,197,320	1,272,210	80.5	589,713	46,967	12,629,604	71.9	6,237,721	436,922
—Cold rolled	12	36	7,131,460	445,779	76.0	309,908	xxxx	4,305,826	66.0	2,589,065	xxxx
—Galvanized	16	37	2,915,130	136,334	56.8	140,542	xxxx	1,568,655	58.8	1,576,821	xxxx
Strip—Hot rolled	24	38	7,055,390	217,363	37.4	144,442	24,211	2,422,635	37.5	1,507,117	254,242
—Cold rolled	35	39	3,119,850	106,508	41.5	108,170	xxxx	1,243,505	43.5	1,171,241	xxxx
Wheels (car, rolled steel)	5	40	319,400	24,267	92.3	23,510	xxxx	267,402	91.5	267,665	xxxx
Axles	6	41	408,170	12,004	35.7	11,951	xxxx	132,902	35.6	136,925	xxxx
All other	5	42	190,490	2,960	18.9	2,984	xxxx	41,509	23.8	38,371	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	4,779,628	413,061	xxxx	xxx	57,509,257	5,208,054
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	78.8%	xxxx	xxxx	xxx	84.9%	xxxx

During 1944 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

CED managers from various Federal Reserve Districts follow:

REGION I
(New England)

Unemployment is far less than many public officials and economists predicted. Industrial orders are piled up beyond comparison. Many industries have booked their entire production through 1946 and 1947. Availability of skilled labor and stability of economic relations are attracting many new concerns to New England. General Motors is building a $12,000,000 plant at Framingham, Mass.; Remington-Rand a $7,000,000 laboratory at Norwalk, Conn.; statewide surveys in New Hampshire and Connecticut indicate construction programs of hundreds of millions of dollars in work plans. An active program of home and industrial construction is indicated over a long period of years.

REGION II
(New York State)

Peak employment in the state reached 6,000,000 during the war. The number of persons registered for unemployment insurance at the end of 1945 totaled only 320,000 of whom 176,000 were certified for benefits. Industries have the greatest backlog of unfilled orders in all time. Of the nation's war savings total of 170 billion dollars, New York has 30 billions. There is need in the state for more than 100,000 new and re-established small enterprises, employing 250,000 persons. Plant reconversion in New York State's industry, 150 days after VJ-Day, is 90 pct completed, except in the heavy industries and aircraft plants. There are serious shortages of labor in the service trades. New York State industries expect to produce 42 pct more goods after reconversion than they did in 1940. A constantly expanding economy over a period of years is expected after new production peaks are attained following reconversion.

REGION III
(Pennsylvania, Delaware, New Jersey)

Manufacturing employment in Pennsylvania, which reached a wartime peak of 1,500,000 in November 1943, dropped to 1,186,000 in October 1945; then climbed back to 1,201,000 in November 1945. Employment in nearly all major industrial groups is substantially above prewar levels, with shortages of labor in unskilled and highly skilled fields, and with greatest surpluses in semi-skilled fields. Manufacturing industries of Philadelphia expect to increase their postwar working force by 20 to 25 pct and their output by 40 to 50 pct as compared with 1940. There is a heavy demand for small plants for light manufacturing. Firms which before the war sold an average of 7 to 10 pct of their output abroad expect postwar overseas shipments of 15 to 20 pct of their total production.

REGION IV
(Ohio-Eastern Kentucky)

Holiday trade for 1945 was 10 to 25 pct greater in 1945 than it was in 1944, an all time high in dollar volume. Statewise employment is nearly 20 pct in excess of that of 1940. All major cities except Canton, Columbus and Cleveland expect to have jobs for all persons wishing to work within six months. The other three cities may require up to a year to provide such employment, including jobs for returning veterans. The strike in flat glass work is still retarding the construction program which is of all time record proportions. The automobile and threatened steel strikes are holding up completion of reconversion plans of some related industries.

REGION V
(District of Columbia, Maryland, Virginia, North and South Carolina and West Virginia)

This region estimates it will have a total of 529,000 manufacturing job opportunities after reconversion, compared with 436,000 in 1940, an increase of 21 pct. Surveys of postwar commercial businesses in the region reveal 185,000 available job opportunities postwar, as compared with 152,000 in 1940, also an increase of 21 pct.

REGION VII
(Illinois, Indiana, Iowa, Lower Wisconsin and Lower Michigan)

The major part of physical reconversion is already accomplished and a satisfactory foundation established for peacetime economic expansion. In spite of currently unsettled labor conditions, unemployment has passed its peak following contract cancellations and is reported to be falling markedly. The turning point was reached in October. Current employment is averaging 16 to 18 pct above 1940 levels and the volume of manufactured goods is running above 1940 levels. Holiday trade for the region averaged 10 pct above 1944. Farm income for the five states in the region is double its prewar level and for the past 2 yr has reached approximately 4½ billion. Demand deposits for the region have also risen by about 1¼ billions in the past 2 yr.

REGION VIII
(Missouri, Iowa, Arkansas, Tennessee)

Industrial facilities in this predominantly agricultural region were expanded by $1.6 billions during the war, and some $7.5 billion worth of prime and subcontracts were completed. However, since many of the new installations were ordnance or other strictly military plants, post VJ-Day production and industrial employment dropped rapidly, in some sections as much as 40 pct. But because of heavy drains made on the region's manpower in agriculture and commercial fields, many of these unemployed war workers quickly found other jobs. There has been no marked decline in pent up reserve purchasing power. Holiday trade was 13 pct in excess of 1944 levels and the 1945 dollar volume was double that of 1939. Surveys of current business plans in the region indicate that, following full reconversion and the overcoming of such problems as material shortages, manufacturing employment will be 40 pct above 1940 levels and about 20 pct below its wartime peak. Non-manufacturing employment is expected to rise 20 pct over 1940. Sizable increase is expected in heavy manufacturing industries since Ford, International Harvester and others are establishing new plants in the region.

REGION IX
(Minnesota, the Dakotas, Montana, Upper Michigan and Upper Wisconsin)

With its agricultural production goals for 1946 almost as high as in wartime, the Region expects unrationed civilian demand plus relief needs for food to maintain 1946 farm income at levels of double its prewar and almost three times its 1935 to 1939 averages. Farm mortgage indebtedness is the lowest in 30 years, and farm assets have risen in five years from 53 to 90 billions. Montana and the Dakotas are absorbing returning veterans and even face a shortage of labor. Only in the two urban centers of Duluth and the Twin Cities has unemployment risen noticeably since VJ-Day. Shortage of materials is listed as the major deterrent to expanded peacetime employment. Department store sales for the holidays were 14 pct above 1944 with the index of department store sales for November, 1945, running 222 pct over the 1935 to 1939 average.

REGION X
(Wyoming, Nebraska, Kansas, Oklahoma, also portions of Missouri and New Mexico)

Despite the employment drop immediately following VJ-Day, the job situation is already balancing quite evenly between supply and demand, with offerings exceeding takers in many areas. This balance is reflected clearly in St. Joseph, Mo., and in Omaha and Lincoln, Neb. Businessmen in Greater Kansas City are planning a 40 pct increase in job opportunities over 1940 to be reached by September 1946. It is emphasized that the industrial labor force developed in the area during the war is now attracting manufacturing concerns from other regions. Farm income for the region, which has more than doubled since 1940, is expected to be maintained through the coming year.

REGION XI
(Texas, Northeast Louisiana, Southwest New Mexico)

Job opportunities in this region continue to exceed substantially the available labor supply. More than 90 pct of all manufacturing facilities which were to be changed over to peacetime operations are in operation. Employment at the beginning of 1946 exceeds prewar levels by more than 40 pct, while industrial production has increased more than 75 pct in the same period. During the war, major increases took place in machine tool manufacturing and oil refining in the region. This added capacity is being used now to meet heavy postwar demands. Many cities have large construction programs, Houston alone planning to spend $300,000,000 in the next two years. Scarcity of materials is retarding building programs. Wage differentials and scarcity of trained salespeople are holding back planned expansions in distribution and service industries. Gulf coast ports have more business than their facilities can handle and have expansion programs to take care of this commerce.

REGION XII—North Portion
(Oregon, Washington, Idaho, Utah)

With present total population of 4,500,000 this region has approximately 117,500 unemployed on Dec. 31, 1945. Peak unemployment of about 170,000 is expected in the early spring. An upward swing of employment will begin then and it is expected that substantially all workers in the four states will be employed by early autumn. Employment then is expected to total 1,785,900 compared with 1,304,962 for the same states in 1940, a gain of 37 pct. Utah estimates a gain of 32 pct in overall employment and 53 pct in manufacturing. Idaho expects a 28 pct gain in employment as compared with 1940. Many new commercial and service firms are being established. Washington state averaging 1500 a month with six workers for each firm. Utah and Idaho metal mines need 5000 additional skilled workers. Large new developments are in progress in the fields of frozen food distribution, food processing, wood pulp, paper, lumber, furniture, fertilizers, metal and coal mining, and other industries. The Pacific northwest lumber industry now has orders for more than 1 billion board ft of lumber, and soon the industry expects to be producing 100 million board ft per week, 97 pct of this for domestic civilian markets.

REGION XII—South Portion
(California, Arizona, Nevada)

The region is experiencing a heavy in-migration, in that almost 90 pct of the war workers who came into the area intend to remain. Many veterans being demobilized at West Coast points are also remaining. So offsetting this situation, there is a rapid movement of new industry into the region in anticipation of several factors, among them the insurance of steel production from new facilities at Fontana and Geneva, plus availability of skilled manpower, and the new potential markets represented by the expanded population. There was more industrial investment in Los Angeles County in October, 1945, than in any entire year of the 30's. Most serious bottlenecks currently reported is the shortage of construction materials, both for manufacturing installations and housing, plus a lag in disposal of government-run facilities and surpluses.

Commenting on these reports, Mr. Hoffman said: "It is time to give intensive consideration to the problem of maintaining high employment once the changeover is completed. There is nothing in our recent experience to suggest that this problem has been solved or that we know how to solve it.

Land Grant Rate Elimination to Affect Competitive Setup

Washington

By L. W. MOFFETT

o o o

• • • **Pronounced changes** in the competitive position of industry in serving government requirements are predicted as a result of Congressional action in abolishing the almost century-old land grant railroad rates. Government traffic moving under these rates, which are 50 pct of the commercial rates, has been swelling the past decade, reached enormous proportions during the war and will continue large in the future. Ostensibly the lower rates apply only to shipments of military supplies for the government. Actually under the government's over-generous interpretation of the terms all sorts of materials not directly related to military operations have nevertheless been called military and have moved under land grant rates.

The land grant rates will be eliminated on Oct. 1, 1946.

Beginning back in the middle of the nineteenth century, the government granted land to the carriers to encourage the construction of railroads through uninhabited sections. In return the government was allowed reduced rates over these lines and it is estimated that over the entire period of the land grant system the government has saved about $1,000,000,000 in rates on troops and supplies while seeing a huge economic growth of the broad sections of the country pioneered through the use of railroad land grants. Altogether about 130,000,000 acres were granted to certain railroads with a total of 21,500 miles. The late Joseph B. Eastman while Federal Coordinator of Transportation estimated the value of the land at 97¢ an acre, so that the actual "awards" to the railroads at the time of the grants approximated $126,000,000. At present the railroads own about 15,000,000 land grant acres, practically all owned by the Southern Pacific, the Santa Fe, the Northern Pacific and the Union Pacific. The latter, which with the Central Pacific in 1869 formed the first transcontinental line, settled its land grant account with the government some time ago and is not among the roads required to make the rate concessions. However, it obviously meets land grant rates in competing with land grant carriers for government traffic.

The move for elimination of land grant rates was widespread. It came from the railroads, shippers, the Interstate Commerce Commission, State Utility Commission, railroad labor brotherhoods and other interested sources. Underlying the move was the contention that the rates were discriminatory in favor of shippers on or near land grant carriers, giving them advantage in bidding on government contracts for materials; that private shippers are forced to pay a part of the cost of transportation for the Federal Government; that they unfairly deprive land grant railroads of their rightful revenue; and that the government should be required to pay a fair share of transportation costs.

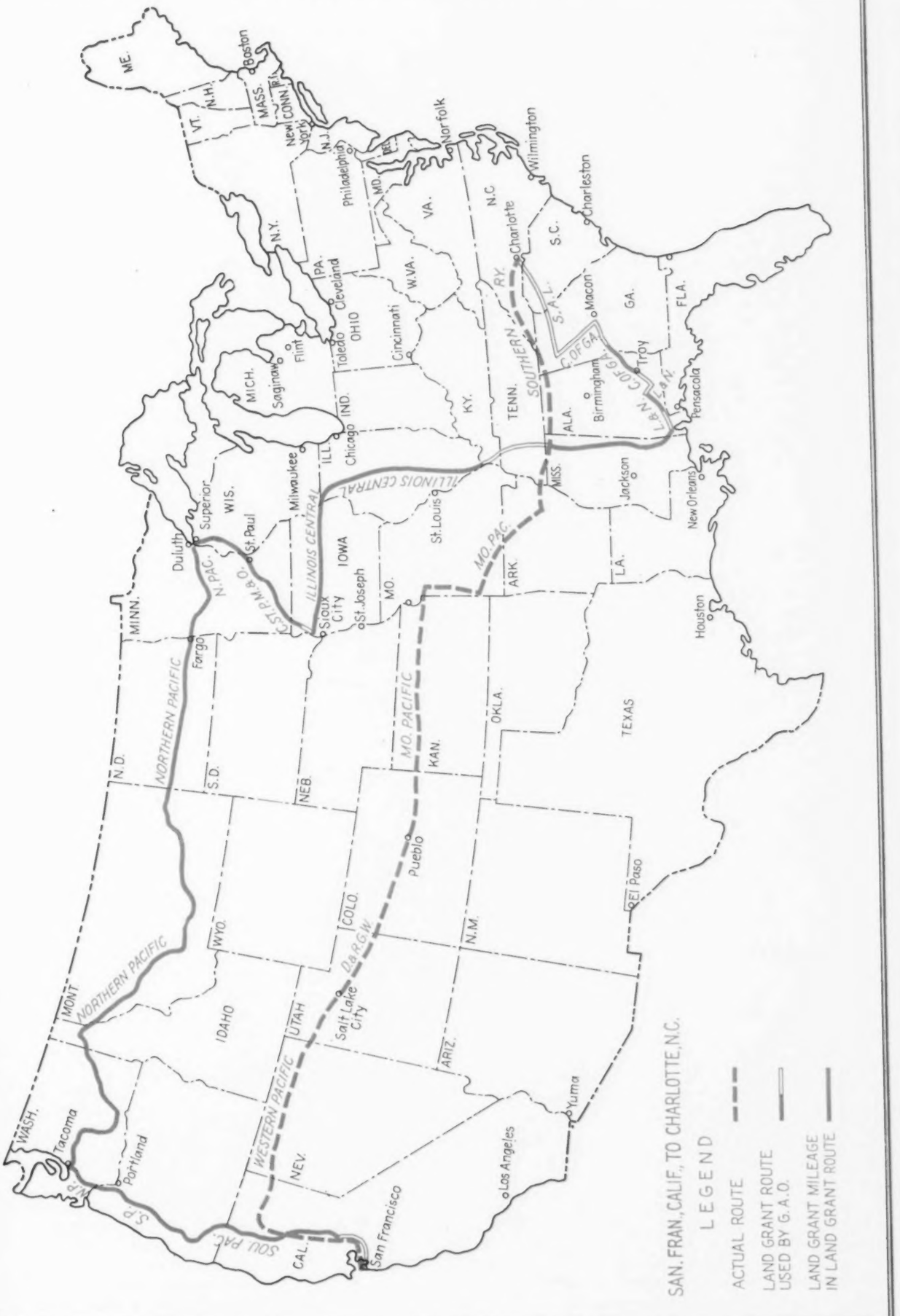
Experienced railroad experts steeped in the complicated subject of land grant rates insist that no one can possibly comprehend all of its ramifications.

To get an inkling of what they mean, it is only necessary to point to the exceptionally able statements made on land grant rates by former Representative Clinton P. Anderson of New Mexico, now Secretary of Agriculture, who tartly condemned the land grant system as an "uneconomic crazy quilt" which the system developed in connection with government purchases. One of the patches in this quilt, which partially explains why land grant rates are, in large degree, secret rates, so far as bidders on government contracts are concerned, is the mixed makeup of the rates. Often the route consists of both land-grant mileage and non-land-grant mileage, resulting in an intricate combination. In such instances the through land-grant rate represents 50 pct of that part of the commercial rate applicable to the land grant mileage and 100 pct of that part of the commercial rate applicable to the non-land-grant mileage. The befuddlement of a bidder in attempting to take into account his own and his competitive transportation costs can easily be imagined. The bidder does not know—he can only guess—what land-grant rate will be used in evaluating his bid. Moreover, he is almost completely in the dark with respect to the land grant rates which will be used in appraising the bids of competitors located at other producing points. It is not possible, save through actual experience which often means the loss of business, to know how much freight must be absorbed.

LAND GRANT ROUTES — *Government traffic moving under land grant railroad rates is carried at 50 pct of the commercial rates. Such traffic has been swelling during the past decade especially during the war period. These land grant rates will be eliminated Oct. 1, 1946. This map shows a typical comparison between land grant route mileage and actual route.*

The greater the proportion of land-grant mileage contained in a railroad route, the lower the land grant rate in comparison with the commercial rate. Between any point of shipment and any point of destination there are generally innumerable routes, running in many cases, Mr. Anderson said, into the hundreds. It is necessary to check every possible route, no matter how long or fantastic it may be, and also to determine the proportion of land grant in each route before the applicable land-grant rate can be ascertained.

After the land-grant rate has been determined by this strange


SAN. FRAN., CALIF., TO CHARLOTTE, N.C.
LEGEND
ACTUAL ROUTE
LAND GRANT ROUTE USED BY G.A.O.
LAND GRANT MILEAGE IN LAND GRANT ROUTE
NORTHERN PACIFIC
MO. PACIFIC
ILLINOIS CENTRAL
SOUTHERN
WESTERN PACIFIC
SOU. PAC.
D. & R.G.W.
N.P.
MO. PAC.
ILL. CENT.
SOUTHERN RY.
S.A.L.
L. & N.
C. OF GA.
ATL. & W.P.
ST. P. M. & O.
Boston
Philadelphia
Norfolk
Wilmington
Charleston
Charlotte
Macon
Troy
Birmingham
Pensacola
Jackson
New Orleans
Houston
Chicago
Milwaukee
Superior
Duluth
St. Paul
Fargo
Sioux City
St. Joseph
St. Louis
Cleveland
Toledo
Cincinnati
Flint
Saginaw
Pueblo
Salt Lake City
El Paso
Yuma
Los Angeles
San Francisco
Tacoma
Portland
ME.
VT.
N.H.
MASS.
CONN.
R.I.
N.Y.
N.J.
PA.
MD.
DEL.
VA.
N.C.
S.C.
GA.
FLA.
OHIO
W.VA.
KY.
TENN.
ALA.
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MINN.
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OKLA.
TEXAS
KAN.
NEB.
S.D.
N.D.
COLO.
N.M.
ARIZ.
UTAH
NEV.
WYO.
IDAHO
MONT
WASH.
CAL.

and perplexing process, it becomes applicable over all routes between origin and destination as a result of equalization agreements. The equalization agreements are commitments whereby non-land-grant roads hold themselves out to meet any land-grant rates.

Discrimination between bidders for government business, it was pointed out, arises from the purely adventitious circumstance that the land-grant mileage available from one producing point to a given market is greater than that available from a competing producing point. It was added that it gives one producer an artificial advantage and deprives another of a natural advantage.

Illustrating this point, Mr. Anderson cited the position of the Colorado Fuel & Iron Co., whose plant at Minnequa, Colo. (just outside of Pueblo, Colo.) is closer to Portland, Ore., by 863 miles than are the Chicago district steel plants. Yet it has to absorb freight of 6.8¢ per 100 lb in meeting Chicago competition on government steel business. In contrast, on commercial business CFI enjoys a rate advantage of 25¢ per 100 lb.

Land Grants To Railroads

State	Acres	Pct of Total Area of State
Alabama	2,850,555	8.6
Arizona	8,369,421	11.5
Arkansas	2,620,011	7.7
California	11,458,212	11.3
Colorado	4,150,461	6.2
Florida	2,226,267	5.9
Idaho	1,389,668	2.6
Illinois	2,595,133	7.2
Iowa	4,021,105	11.2
Kansas	8,244,469	15.7
Louisiana	1,328,134	4.3
Michigan	3,129,297	8.4
Minnesota	9,977,189	18.4
Mississippi	1,075,345	3.6
Missouri	2,299,540	5.2
Montana	15,160,787	16.1
Nebraska	7,343,900	14.8
Nevada	5,049,914	7.1
New Mexico	3,514,132	4.5
North Dakota	11,036,174	24.3
Oregon	3,611,751	5.8
Utah	2,195,729	4.0
Washington	8,264,239	18.7
Wisconsin	3,707,504	10.3
Wyoming	4,845,052	7.7

From Chicago to Portland the distance is 2169 miles, while from Minnequa to Portland the distance is only 1306 miles. The land-grant rate from Chicago is only 56¢ while the land-grant rate from Minnequa is 62.8¢. On the other hand, the commercial rate from Chicago is $1.10 while from Minnequa the commercial rate is 85¢.

That the government cashed in big on the land grant setup while the railroads, by the same token, took a heavy financial punishment, is strikingly shown by the estimate that wartime savings to the government from land-grant rates were estimated at $200 million a year. The term "savings" obviously is used in a loose sense.

In reality, there are no savings. Clearly the railroads must receive sufficient revenue to keep themselves in financial and physical condition to provide adequate service. Hence, inadequate land-grant rates have to be offset by higher commercial rates than would otherwise be necessary—or the railroads are straining their treasuries to the detriment of improved service.

Meanwhile, abolition of land-grant rates plainly will establish a natural and more efficient flow of traffic and set up a more nearly normal competitive situation in industry, the full effect of which can be known only from actual operation of a completely organized commercial rate system of railroad transportation.

Foresees New High In Industrial Building Reaching Peak in '46

Cleveland

• • • **Predicting a new** high in peacetime volume of industrial building activity during 1946, George A. Bryant, president of the Austin Co., said the demand for speedy completion of manufacturing and research facilities in the face of increasing building costs reflects industry's determination to meet the bogey of rising labor rates by improved methods, products and efficiency.

"There is no use deceiving ourselves about costs," Mr. Bryant declared, "but high as they are, who can say they may not go higher." Many of the country's most conservative companies are going forward with major construction programs in the face of the most unsettled conditions the building industry has known for a long time, he added.

"Underlying most of the 200-odd projects on which we are actively at work is the confidence of an owner who knows that the profits to be realized by speedy completion of his building program will quickly offset the initial cost. In some cases these savings are the direct result of greatly improved layout which cuts lost motion, eliminates non-productive labor and makes more efficient use of floor space, manpower and production equipment," said Mr. Bryant. In other instances, the design of the plant itself, through the use of improved structural elements and building materials, more serviceable facilities and better working conditions, offers advantages sufficient to justify the move. Opportunities for substantial freight savings, improved distribution facilities, lower taxes or utility rates and other cost-reducing factors account for still another group of projects in which the choice of location reflects the same ultimate aim. In each instance the basic objective has been to get the business on a basis which will enable it to compete successfully in the face of any possible contingency."

Mr. Bryant pointed out that the accelerated wartime pace of research activity has only served to stimulate the demand for basic research facilities in America's leading industries, projects concerned with the development of materials, methods and products.

He reported the Austin year-end index of industrial cost (1926-100) at 132, up three points during the final quarter of 1945, compared with an index figure of 122 at the end of 1944.

Summing up the industrial building situation, Mr. Bryant said that a careful checkup of manpower and available building materials and equipment in our districts from coast to coast discloses critical shortages of labor and raw materials in a number of the supplying industries. These shortages are responsible for the unsettled price situation in many localities. There is building, however, of much more settled conditions among skilled and common labor in the construction field itself, but the possibility of continued overtime may keep costs up until existing shortages in housing, industrial and commercial buildings and public works have been met.

Farm Implement Needs In Britain Totalling 80 Million Per Year

London

• • • **A survey recently** completed by the National Farmers Union forecasts a British demand of $80,000,000 worth of agricultural equipment per year in the next few years until the backlog of demand is exhausted. Included in the figure is an estimation of approximately 40,000 tractors per year.

Recognizing the assistance which has been afforded to British farmers during the war in the shipment of lend-lease machinery from America and also some from Canada, the farmer's group expresses the hope that British industry will pay more attention in the postwar period to agricultural needs.

The following list of annual requirements does not include the needs of the dairying and poultry farming industries:

Description	Number Required	Value
Track layers	2,100	$5,800,000
Tractors	38,000	32,900,000
Ploughs (tractor)	20,000	6,000,000
Ploughs (horse)	3,000	108,000
Disc harrows	9,000	2,520,000
Cultivators	15,000	4,200,000
Tool bars	6,000	1,200,000
Corn drills	4,700	1,300,000
Combine drills	6,800	3,808,000
Root drills	4,000	480,000
Fertilizer distributors	14,500	3,828,000
Potato planters	700	224,000
Potato lifters	7,000	1,568,000
Mowing machines	15,000	3,000,000
Rakes	15,000	2,040,000
Swath turners and tedders	14,000	2,240,000
Sweeps	8,600	380,000
Hay loaders	1,700	388,000
Binders	10,300	4,120,000
Combines	1,200	3,696,000
Threshing machines	500	1,100,000
Balers, pick up	1,000	2,280,000

Offer Metals and Products

West Springfield, Mass.

• • • **A sale of surplus steel,** nonferrous metals and fabricated metal basic products is to be held here Jan. 21, 22 and 23 at the RFC sales center on Day St., it has been announced by SPA. A list No. BO-7-1 dated Jan. 10 describing the material is published by the RFC Surplus Property Div. at Boston.

Industrial Briefs...

• OPENS NEW LAB.—Federated Metals Div., American Smelting & Refining Co., has announced the opening of a new $100,000 physical testing laboratory at the company's Whiting, Ind., plant.

• WELDING AWARD—To stimulate undergraduate interest in welding, funds have been donated by A. F. Davis, of the Lincoln Electric Co., for the A. F. Davis Undergraduate Welding Award, which will consist of four cash prizes totaling $700 to be presented annually to authors and publications for the best and second best articles on welding published in undergraduate magazines or papers during the preceding year.

• BUILDING PLANTS—Ceco Steel Products Corp. has launched an expansion program involving 14 plants from coast to coast, it has been announced.

• PACKAGING MACHINE CORP.—Manufacturers of a complete line of automatic and semi-automatic case sealers, compression units, and other automatic packaging equipment will be undertaken by the A-B-C Packaging Machine Corp., Quincy, Ill., recently incorporated under Illinois laws. The corporation will take over and continue the business of the A-B-C Packaging Machine Co., a limited partnership.

• TO BUILD FOUNDRY—A foundry and machine shop will be constructed in Kingsford near Iron Mountain, Mich., for production of lightweight iron castings. This announcement was made by F. A. Flodin, president of Lake Shore Engineering Co., of Iron Mountain and Marquette, Mich., which will operate the facility together with Grede Foundries, Inc., of Milwaukee. Mr. Flodin said the initial plant covered only a portion of a proposed expansion plan to be developed over a long period. Design of the plant is being undertaken by Giffels and Vallet, Detroit engineers.

• NEW SUBSIDIARY—A. J. Murray, president of the A. B. Murray Co., Inc., steel and tube warehousemen, has announced the formation of an affiliated organization, the Murray Tube Works, which will engage in the custom fabrication of tubular steel. The new concern is located at Green Lane, Elizabeth, N. J.

• OPENS NEW PLANT — The Harnischfeger Corp., Milwaukee, has leased a 16-acre site from the city of Port Washington, Wis., for a new plant to manufacture prefabricated dwellings.

• SUPERCHARGER MOVE—Operations of the B-W Supercharger, Inc., Milwaukee, are being moved to Cleveland. The firm is a subsidiary of Borg-Warner and will utilize the facilities of Pesco Products Co. at Cleveland, another Borg-Warner affiliate.

• BUYS RFC PLANT—International Harvester Co. has purchased the government-owned plant operated by Republic Aviation Corp. during the war for the manufacture of its refrigeration line. Harvester paid the RFC $5,648,000 for the plant.

• EXPANDS OUTPUT — Aeronca Aircraft Corp., Middletown, Ohio, announced during the past week an immediate expansion program which will increase production of light planes from the present daily capacity of 20 to 35. Expansion plans include additional facilities for painting, welding, jig making, tool making, material handling, experimental and lofting facilities, as well as additional mechanized conveyor equipment.

• BUYS STOVE CO.—The Estate Stove Co., Hamilton, Ohio, was sold last week to Noma Electric Corp. The purchase price was reported to have been for two million dollars cash and 35,000 shares of common stock of the Noma Corp.

MACHINE TOOLS

. . . News and Market Activities

Tool Disposal Given Top Priority

Washington

• • • **Surplus Property Administrator** Symington told members of the Metalworking Machinery Industry Advisory Committee at their initial meeting Jan. 15 that the SPA had placed Government-owned disposal of surplus machine tools at the top of all surplus disposal problems. He also called for close industry - Government cooperation leading toward disposal of the $223 million worth of machine tools now available.

Present inventory, Mr. Symington told the Committee, consists of 27 pct lathes, 21 pct boring machines, 18 pct milling machines, 13 pct grinding machines and the remainder in gear cutters, finishers, drills and other types. He pointed out that more than 100,000 machine tools are involved.

Although the selling job will continue to be the primary objective, Mr. Symington declared that the Government is in the machine tool market on a temporary basis only and does not propose setting up large scale offices necessary for permanent operations. The machine tool industry is most deserving of relief from the threat of an overhanging Government surplus, he added.

Current SPA estimates are that in addition to the $304 million worth declared surplus as of Nov. 30, 1945, tools costing nearly $1.5 billion will be available by July 1947.

Only $81 million worth of machine tools have been disposed of as of Nov. 30, 1945, the Committee was told, approximately $40 million having been realized from the sale of 21,000 machine tools involved.

Commenting on the operations of the RFC dealer disposal set-up, Mr. Symington urged that 3000 dealers participate in the program. As of Dec. 31, 522 dealers had applied for agency franchises, Mr. Symington said. Mr. Symington proposed that 31 regional machine tool industry advisory committees be established —one in each RFC region—in order that they might assist in the solution of problems relating to selection, purchase and payment at the regional level. These committees will serve in a purely advisory capacity, the details of the plan to be worked out by the central committee.

The new machine workers industry advisory committee includes the following memberships:

Robert Bierbaum, Eastern Machinery Co., Cincinnati; A. G. Bryant, Cleerman Machine Tool Co., Chicago; A. B. Einig, Motch & Merryweather Machinery Co., Cleveland; H. H. Goldman, Detroit; W. P. Kirk, Niles-Bement-Pond Co., West Hartford, Conn.; Knowles Pittman, Clearing Machine Corp.; Frank Reeb, Niagara Machine and Tool Works, Buffalo; C. A. Simmons, Sr., Simmons Machine Tool Corp., Albany, N. Y.; R. L. Giebel, Giebel Machine Tool Co., New York, and J. Y. Scott, Vannorman Co., Springfield, Mass.

•

Dealer Response On SPA Plan Seen Good

Cleveland

• • • **In this area at least,** dealer response to the Surplus Property Administration-RFC plan for utilization of what are commonly called the normal channels of trade in the machine tool industry has been satisfactory. The local disposing loan agency of the RFC has had preliminary negotiations with about 100 potential licensees, and it is expected that an announcement that some 40 more firms have been given licenses will soon be forthcoming.

The first list, put out a few days ago, included one veteran, David D. Balcher, doing business as Balcher Machinery Sales, and the Motch & Merryweather Machinery Co., along with nine other firms here including: L & W Machinery Co., Moslo Machinery Co., Saunders Machinery Exchange, Garco Machinery Co., Lakeside Machinery Co., Horvitz Merchandise Co., Noll Equipment Co., International Steel Ind. Co., and Herman Machinery Co., Diamond Sales & Engineering Co., Columbus, Ohio, was licensed about two weeks ago.

A commission of 12½ pct of the established sales price will be paid to approved dealers, who will solicit orders from prospective buyers, subject to final acceptance by RFC. No commission will be paid on machine tools and machinery which the approved dealer may purchase for use within his own business; nor may the dealer collect on sales to Federal, state or local governments or instrumentalities thereof. Sales to lessees or contractors in possession are also in the non-commission group.

All surplus machine tools sold under this plan will be sold on the usual RFC basis without warranties other than to description; all sales prices will be quoted and sales will be effected f.o.b. cars or trucks at point of location.

Many dealers and firms which have been in business for a number of years are making application for license under this plan to protect the considerable amount of missionary work they have done, as much as for any other reason.

•

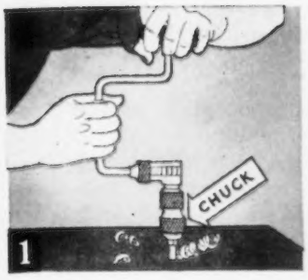
Labor Troubles Big Worry

Cincinnati

• • • **The troubled** labor market causes concern in the local machine tool market because of its possible indirect effect upon the present operations. While no strikes or labor stoppages are current or threatened among tool company employees the troubles in steel, automotive and other industries are likely to have repercussions in machine tools. In fact, for the past several weeks and with more acuteness currently, tool builders are experiencing difficulty in obtaining necessary components to complete tools now on the assembly floors.

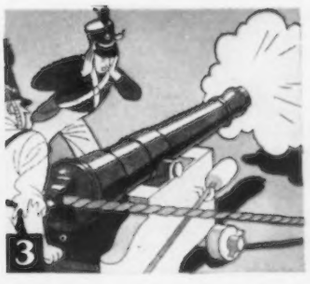
So far as new business is concerned, however, the industry indicates a good flow of orders and if production is not curtailed the current year should be satisfactory. New business is fairly well divided between domestic and foreign sources with tool types pretty well diversified.

First you've gotta know what a chuck is

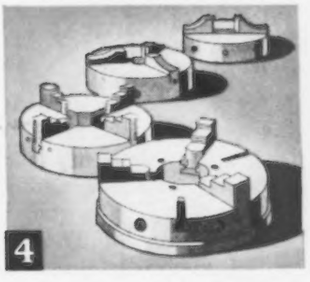


Chucks hold tools or work that are in motion.

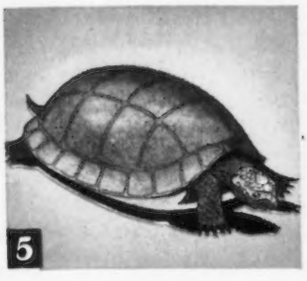
Chucks owe their origin to the ancient potter's wheel.



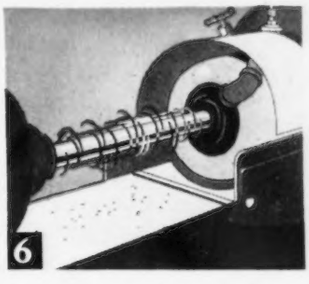
First chucks were used for making cannon in War of 1812.



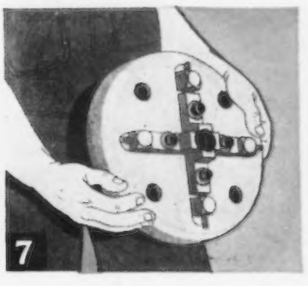
There are many kinds of chucks. Here are some in common use.



Many chucks are too "slow" for modern high-speed production.

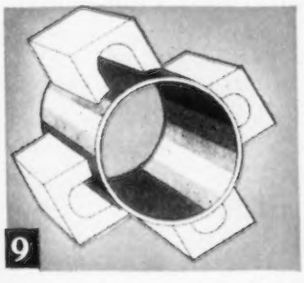


Other chucks aren't positively true —lack hair-splitting accuracy.

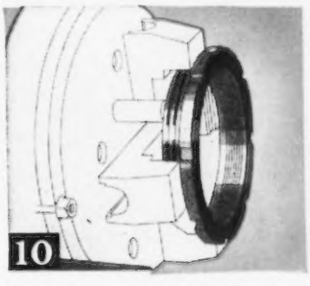


New and better is the amazing Woodworth Diaphragm Chuck.

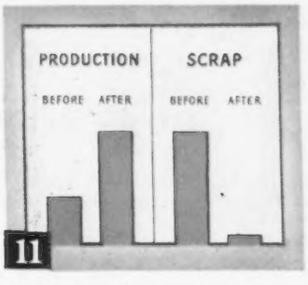
Jaws fasten to diaphragm which flexes like bottom of oil can.



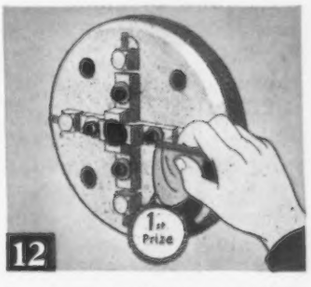
Thin-walled parts won't distort in machining to close accuracy.



Large, heavy parts can be processed with fine precision.



Steps up production 2¼ times—scrap practically eliminated!



A winner! Industry acclaims Woodworth Diaphragm Chuck!

What Woodworth Products Mean to Industry

THE DIAPHRAGM chuck is a typical Woodworth contribution to mass production efficiency. Here's why.

Every Woodworth product must conform to the basic policy of this company—*TO MAKE ONLY PRODUCTS WHICH WILL BENEFIT INDUSTRY THROUGH INCREASED PRODUCTION AND REDUCED COSTS.*

This means that the great demand for Woodworth Tools and Gages will be continuing, especially in view of the coming battle for postwar markets.

And it means that Woodworth engineers have been charged with the responsibility of searching constantly for new ways to speed up and lower the cost of production, in connection with Woodworth Products of the future.

The constant growth and expansion of the N. A. Woodworth Company is due to strict adherence to these objectives.

ACCURACY YOU W CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD, DETROIT 20, MICHIGAN

PRECISION GAGES

PRECISION MACHINED PARTS

PRECISION TOOLS

NONFERROUS METALS

. . . News and Market Activities

Zinc Grades Short; 1945 Stockpile Grows

New York

• • • **Annual statistics on zinc** to the end of 1945 have been released by the American Zinc Institute and show marked reductions in production and shipments this year as compared with 1944 and the three previous years. Production of 799,462 net tons in 1945 compares with 1944 production of 901,332 tons, with monthly production averages of 66,622 and 75,111 tons respectively. Production during 1945 was fairly well in balance with shipments which reached a total of 777,649 net tons compared with 837,322 in 1944, monthly averages of 64,804 and 69,777 tons. Both production and shipments were somewhat higher in 1943 and 1942 than in either of the two later years.

The stockpile has grown during the year to a tonnage of 259,333. This growth started from a low point during the year in April, 168,539 tons. Unfilled orders at the end of the year totalled 27,092 tons.

While the zinc stockpile would indicate that ample supplies of all grades of zinc should be available to consumers, this is not quite true since there are relative shortages of Special High Grade and Prime Western.

Chinese Antimony Imports

New York

• • • **It is reported** that some shipments of Chinese antimony have already come into the country in small tonnages and have been sold at a price competitive with that of Mexican antimony delivered Laredo. In prewar years it was customary for importers to absorb the 2c per lb duty on foreign antimony which served to keep the foreign metal in competition with domestic.

While antimony continues in sufficiently limited supply to require continued allocation, it is adequate to permit use of the metal by all consumers who desire it. Formerly, some consumers had to meet part of their requirements by the use of antimony ore.

Copper Deliveries Low at Year's End

New York

• • • **Copper statistics** for 1945 indicate that production of both crude and refined copper, and deliveries to customers during that year were well below any previous wartime year. Production of copper by mines and smelters reached 841,824 net tons in 1945 compared with 1,056,180 tons in 1944 and higher tonnages in previous year. Refined copper production dropped to 843,113 tons during the year, compared with 1,098,788 in 1944 and larger tonnages in earlier war years. Deliveries to customers totaled 1,517,842 tons which represents 120,000 tons below 1944 deliveries.

During the year production started at a relatively high rate, particularly from mines and smelters which in January was 6,000 tons above refinery production. Gradually production diminished until the low point was reached in December at 62,798 and 66,062 tons, respectively. Meanwhile, the more recent months have seen reasonably high consumption of copper, well above the low months of July, August and Sept. but not as high as peak sales of January, February, March and April. December deliveries total 103,464 tone, a decline of 13,500 tons from November.

With the uncertainty in the brass mill labor picture, it is not reasonable to assume that deliveries in the next month may be expected to exceed December's rate, particularly in view of the large government stockpile of copper. How this Connecticut Valley problem will be worked out will determine what may be the future of the domestic copper market.

High Nickel Alloy Precision Casting

New York

• • • **A pilot plant at** the Bayonne Works of the International Nickel Co. has been producing a variety of precision castings in nickel, monel, inconel and and other nickel alloys. The capacity of the present pilot unit is limited to about 500 pieces a week.

A plant for large scale production already has been started at Bayonne and is scheduled for operation early in 1946.

Typical precision castings range from special-type pump parts to turbine blades. The castings are designed to provide users of these materials with complicated shapes which it frequently has not been practical or economical to obtain in sand castings or by machining from forged stock.

Like precision castings in other materials, those of nickel alloys can be held to exceptionally fine tolerances and may range from a few ounces to over 3 pounds in weight. The weight range of precision castings from the commercial plant is expected to run higher.

Mexican Lead Strike

New York

• • • **A strike in the** Mexican lead mines has been responsible for prospective curtailment of lead imports from that country in the near future. In view of the serious need for lead in the reconversion program, this additional limitation of inadequate supplies represents a blow to the Administration's program.

Current allocations are predicated on some importation from Mexico, Canada, and South America. While tonnages coming from abroad have not been great, a complete stoppage from any one source will be likely to have serious consequences. The industry advisory committee is meeting in Washington Jan. 21 and it is conceivable that the provisions of the lead conservation order may be modified at that time.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$90-$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$109 to $112
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	71.11
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	7.25 to 10.00
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	20.87	..	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	..	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	..	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	..

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. *Plate:* 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c. *Flat Sheet:* 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ⅓ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ⅓ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00[1]
Manganese bronze solids	6.00[2]
Manganese bronze borings	6.25[1]

OPA Group 4†

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	4.00
25S turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.25
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb.; 90 to 98% Ni, 23¢ per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19⅛
Curved	20⅜
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.6083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

SCRAP

Strike Jitters Hold Repeat Performance

New York

• • • **Scrap reports from** all sectors of the country are colored this week with strike news. With the approach of the original steel strike date, Jan. 14, the industry had engaged in a frenzied rush to make preparations for deliveries during the strike or else to accomplish stockpiling prior to the halt in operations.

This past weekend was to have been the deadline for deliveries. The postponement of the steel strike has resulted in a new rush of buying with next weekend now the climax period. However, the fact that it was possible to postpone the strike, has raised the hopes of many that parties involved may actually reach an agreement.

It is said that the agenda of the scrap convention in Chicago, next week, will include a call for raising the differential between prepared and unprepared scrap from the $3.50 now in effect, to $5.00. The statement has been voiced that even at $5.00 the dealer loses money.

No price changes have been reported during the past week. Supplies are still inadequate to fill the heavy demand. In Canada, deliveries have dropped to the lowest average in years, and many dealers state that they are unable to keep yard crews engaged on current receipts.

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PITTSBURGH—The market here is beginning to feel the effects of the pending steel strike, with two large consumers on Friday ordering suppliers to withhold shipments until further notice. One large consumer here has made plans for the unloading of scrap on the property of its railroad subsidiary, but this is no assurance that scrap will keep flowing into the plant. It may develop that railroad employees will refuse to handle the material in sympathy with the CIO strike. Supplies of scrap are no better than they have been for the past several weeks, but with consumers holding back on incoming shipments there may develop a lull in the market until after the strike is settled. A couple of consumers as early as week before last informed dealers to slow down shipments both because of the impending strike and because their stocks were building up a bit more than desired.

Bowman Promoted

• • • **Luria Brothers and Co., Inc., announces the appointment of Amos Bowman, vice-president, as district manager of the Pittsburgh area, replacing Joseph Jacobson, deceased.**

CHICAGO—District mills bedded themselves down for the steel strike by making arrangements for storage of scrap at points outside, but near, plants. No principal consumers made outright cancellations of orders, except on such perishable items as turnings, which constitute a very small proportion of total volume. One large mill began diversion of scrap for storage late last week. It is reported that some orders cancelled by mills in the Mississippi Valley and Western districts have been diverted to Chicago for storage. It is pointed out, however, that in the event of a long strike, production of industrial scrap will slow down as industrial steel inventories are depleted with the result that scrap flow will fall to a dribble.

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PHILADELPHIA — The market here continues at ceiling, with most mills placing orders to the extent of production capacity, despite the impending strike. Pittsburgh mills have shown willingness to pay as much as $5.60 freight to bring Eastern scrap out, but local market factors are said to be refusing the business in order to reserve this material for local consumers.

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DETROIT—The situation continued the same here this week—no slackening in demand, and no increase in available supply. A small amount of reconversion and war contract cancellation scrap continues to flow into regular channels, but factory-produced material is at a minimum.

•

BOSTON — Movement of material to Pennsylvania steel mills is practically nil. Shippers are unwilling to take a chance of their cars being unloaded at the mill, or ordered held by the consumer, thus leaving them holding the bag. In contrast, the flow of low phos and cast, particularly the former, to foundries is in larger volume. Supplies have suddenly come from nowhere, plenty of trucks are available and road conditions are perfect for transportation.

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NEW YORK — Demand continues strong with supplies still lagging, and prices remain firm at ceiling. The postponement of the steel strike has resulted in a renewal of the frenzied buying in order to stock material. The 2nd Service Command, U. S. Army, has awarded 1500 tons of unprepared scrap at the ceiling price of $12.33 f.o.b. barge Brooklyn, and 400 tons of miscellaneous charging steel scrap at the ceiling price of $15.83 to Luria Bros. and Co.

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CLEVELAND—While all signs pointed to a steel strike, prices on termination inventory were soaring to currently unprecedented highs in probably the most disproportionate supply and demand situation the scrap market here has seen for many a day. At one plant, 2100 tons of shells brought a reported $21.65, where is, as is; and on the same basis, 5700 tons of steel brought a reported $18.13 at another plant down state, where 1500 tons of cast brought a reported $19.55. At still another plant, 1500 gross tons of termination material brought a reported $18.93, where is, as is. All major consumers were continuing to take shipments right up to the deadline, and plans for storing scrap in shippers' yards for the time being were reported made. Lurking in the background, however, was the possibility of an embargo. In the valley it is reported that a shipment of scrap was received from Florida, which seems to cast additional light on the local situation.

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CINCINNATI—Extreme strength characterizes the local scrap iron and steel market. Dealers indicate that the supply of available material is narrow, and demands broad. Prices, of course, continue to be at ceiling, and were it not for the present lids, there would be a strong upward movement of quotations. Production scrap is particularly light, and unfavorable weather has caused a drop-off of country scrap collections.

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ST. LOUIS — The shortage of scrap iron in this market has become more serious as a result of a strike of freight truck drivers, which has tied up all lines. Scrap cannot be moved by truck to yards, nor can oxygen and acetylene tanks be hauled to processing plants. Steel mills are taking all material shipped to their yards. The market is firm at unchanged prices.

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BIRMINGHAM—Despite the blow dealt to deliveries of openhearth and blast furnace material by the situation in the steel industry, demand for foundry grades is brisk in market. Excessive rain, however, has hampered both collection and preparation. Prices generally are unchanged.

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TORONTO — With the serious scrap shortage continuing, there is no quibbling with regard to prices and consumers are not hesitating in paying top ceiling for available materials. Canada's scrap supply is decidedly thin, and while there are some indications of betterment in offerings from industrial plants, very little material is being offered from other sources. Dealers deliveries have dropped to the lowest average in years and many state they are unable to keep yard crews engaged on current receipts.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Angles & splice bars	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	$13.50 to 14.00
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.00 to 15.75
No. 1 hvy. melting	15.00 to 15.75
No. 2 hvy. melting	14.00 to 14.75
No. 2 bales	12.50 to 13.25
No. 3 bales	8.50 to 9.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$12.00 to $13.00
No. 2 hvy. melting	11.00 to 12.00
No. 2 bales	10.00 to 11.00
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$10.00
No. 1 & No. 2 hvy. melting	10.00
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Jan. 15, 1946	Jan. 8, 1946	Dec. 11, 1945	Jan. 16, 1945
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.00	$5.00	$5.00	$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.75	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (dollars per gross ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (per gross ton)	Jan. 15, 1946	Jan. 8, 1946	Dec. 11, 1945	Jan. 16, 1945
No. 2 foundry, Phila.	$27.59	$27.59	$27.59	$25.84
No. 2, Valley furnace	25.75	25.75	25.75	24.00
No. 2, Southern, Cin'ti	26.19	26.19	26.19	24.44
No. 2, Birmingham	22.13	22.13	22.13	20.38
No. 2 foundry, Chicago†	25.75	25.75	25.75	24.00
Basic, del'd eastern Pa.	27.09	27.09	27.09	25.34
Basic, Valley furnace	25.25	25.25	25.25	23.50
Malleable, Chicago†	25.75	25.75	25.75	24.00
Malleable, Valley	25.75	25.75	25.75	24.00
L. S. charcoal, Chicago	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 15, 1946	2.44076¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.
One week ago	2.44076¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.
One month ago	2.44076¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.
One year ago	2.38444¢ per lb.	$23.61 per gross ton.	$19.17 per gross ton.

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.44076¢ Oct. 2	2.38444¢ Jan. 2	$25.37 Oct. 23	$23.61 Jan. 2	$19.17	$19.17
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17	$15.67 Oct. 24
1943	2.25513¢	2.25513¢	23.61	23.61	19.17	$19.17
1942	2.26190¢	2.26190¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 9
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941 issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

STAINLESS STEEL PIPE FITTINGS

Right in Stock

Stainless fittings are just as easy to get as stainless pipe —from Frasse. In addition to a complete range of types 304, 316, 347 seamless and welded *pipe,* Frasse keeps a fat stock of stainless *fittings* handy, too.

Elbows, tees, couplings, nipples, bushings, unions and similar screwed fittings can be furnished from Frasse warehouse *at once.* Stock standard is type 304, 150 pounds W.P. . . . other analyses and special fittings can be shipped on short notice. Valves, too, are quickly available in standard gate and globe, type 304.

Whatever you build of stainless, you'll find Frasse a quick source—not only for bars, sheet, tubes and pipe, but accessories as well. It's easy . . . more convenient . . . to get *all* your stainless from Frasse. *Call Peter A. Frasse and Co., Inc. 17 Grand St., New York 13, N.Y. (Walker 5-2200) 3911 Wissahickon Ave., Philadelphia 29, Pa. (Radcliff 7100) 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) Jersey City • Hartford • Rochester • Syracuse • Baltimore*

FRASSE

STAINLESS STEELS AND TUBING

BARS	SHEETS	PLATES	STRIP
Types 302, 303 316, 347	Types 302, 304 316, 347	Type 304	Type 302
ANGLES	**TUBING**	**PIPE**	**WIRE**
Type 304	Types 304, 316	Types 304, 316 347	Type 302

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb. to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15c. per lb higher.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($31.00 f.o.b. mill)														
Carbon, forging	$36	$36	$36	$36	$36	$36	$36								
Alloy	$45	$45				$45	(Bethlehem, Massillon, Canton, Coatesville—$45)								
BILLETS, BLOOMS, SLABS							(Provo—$47.20, Duluth—$38[14])								
Carbon, rerolling	$36	$36	$36	$36	$36	$36	$36	$36				$48[14]	$38		
							(Provo—$53.20, Duluth—$44[14])								
Carbon, forging	$42	$42	$42	$42	$42	$42	$42					$54[14]	$44		
Alloy	$54	$54				$54	(Bethlehem, Massillon, Canton—$54)						$56		
SHEET BARS	$36	$36		$36		$36	$36	$36	(Canton—$36)						
PIPE SKELP	1.90¢	1.90¢					1.90¢	1.90¢	(Coatesville—1.90¢)						
WIRE RODS[15]															
No. 5 to 9/32 in.	2.15¢	2.15¢		2.15¢	2.15¢	(Worcester—2.25¢)					2.40¢	2.65¢			
SHEETS															
Hot-rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold-rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes[2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot-rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold-rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester—3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity cold-rolled	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester—3.35¢)					3.05¢	3.31¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00		$5.10				$5.10					$5.36	$5.32
Electro, box 0.25 lb	$4.35	$4.35	$4.35												
Electro, box 0.50 lb	$4.50	$4.50	$4.50						$4.60						
Electro, box 0.75 lb	$4.65		$4.65						$4.75						
BLACKPLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[11]			3.37¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS								(Duluth—2.35¢,							
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25	Provo, Utah 2.95¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel[6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold-finished[8]	2.75¢	2.75¢	2.75¢	2.75¢		2.75¢		(Detroit—2.80¢)			(Toledo—2.90¢)			3.09¢	3.07¢
Alloy, hot-rolled	2.70¢	2.70¢				2.70¢	2.70	(Bethlehem, Massillon, Canton—2.70¢)					2.80¢		
Alloy, cold-drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont—2.25¢, Provo, Utah 2.95¢)							
Carbon steel[13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.82¢
Alloy	3.50¢	3.50¢			(Coatesville—3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem—2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester—3.00¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester—4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester—8.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester—8.55¢)								
WIRE[9]															
Bright[12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester—2.85¢)		(Duluth—2.80¢)			3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (high carbon)	3.35¢	3.35¢		3.35¢			(Worcester—3.45¢)					3.85¢			3.67¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	21.25	20.40	15.725	16.15	19.125	23.375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	21.25	20.40	15.725	16.15	19.125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	21.25	20.40	15.725	16.15	19.125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	25.00	24.00	18.50	19.00	22.50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	25.00	24.00	18.50	19.00	22.50	27.50
Plates, P'gh, Middletown, Canton	29.00	27.00	21.50	22.00	26.50	30.50
Shapes, structural, P'gh, Chi	25.00	24.00	18.50	19.00	22.50	27.50
Sheets, P'gh, Chi, Middletown, Canton, Balt	36.00	34.00	26.50	29.00	32.50	36.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	23.50	21.50	17.00	17.50	24.00	35.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	30.00	28.00	22.00	22.50	32.00	52.00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila	25.00	24.00	18.50	19.00	22.50	27.50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	30.00	28.00	22.00	22.50	32.00	52.00
Rod, h-r, Newark, N. J., Syracuse	25.00	24.00	18.50	19.00	22.50	27.50
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	66.63	66.63	.....	63.30	.....	....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

*Base, f.o.b. Pittsburgh; *f.o.b. Chicago, Gary*

	per lb
Field grade*	3.30¢
Armature*	3.65¢
Electrical*	4.15¢
Motor*	5.05¢
Dynamo	5.75¢
Transformer 72	6.25¢
Transformer 65	7.25¢
Transformer 58	7.75¢
Transformer 52	8.55¢

F.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb
No. 1 O.H., gross ton $43.00
Angle splice bars, 100 lb..... 2.70

(F.o.b. basing points)	*per gross ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	base per lb
Cut spikes	3.25¢
Screw spikes	5.40¢
Tie plate, steel	2.30¢
Tie plates, Pacific Coast	2.45¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)

*(*Also Canton, O.)*	*base per lb*
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.00*	19.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	18.00	....
Inconel-clad 10 pct, f.o.b. Coatesville	25.00	....
Monel-clad 10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	base per keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.20	$3.70
Annealed galv. fence wire	3.55	4.05
	base column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	92
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.00	$12.00
15-lb coating I.C.	7.00	14.00
20-lb coating I.C.	7.50	15.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms, and Slabs	Bars and Bar-strip	Billets, Blooms, and Slabs
NE 8600	0.65¢	$13.00	$1.15	$23.00
NE 8700	0.70	14.00	1.20	24.00
NE 9400	0.75	15.00	1.25	25.00
NE 9700	0.65	13.00	1.15	23.00
NE 9800	1.30	26.00	1.80	36.00
NE 9900	1.20	24.00	1.55	31.00

The extras shown are in addition to the base price of $2.70 per 100 lb on finished products and $54 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.25¢ per lb for bars and bar-strip and $5 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
⅛-in.	63½	51
¼-in.	66½	55
⅜-in. to 3-in.	68½	57½
Wrought Iron (buttweld)		
⅛-in.	24	3½
¼-in.	30	10
⅜-in. and 1¼-in.	34	16
1½-in.	38	18½
2-in.	37½	18
Steel (lapweld)		
2-in.	61	49½
2½-in. and 3-in.	64	52½
3½-in. to 6-in.	66	54½
Wrought Iron (lapweld)		
2-in.	30½	12
2½-in. to 3½-in.	31½	14½
4-in.	33½	18
4½-in. to 8-in.	32½	17
Steel (butt, extra strong, plain ends)		
⅛-in.	61½	50½
¼-in.	65½	54½
⅜-in. to 3-in.	67	57
Wrought Iron (same as above)		
⅛-in.	25	6
¼-in.	31	12
⅜-in. to 2-in.	38	19½
Steel (lap, extra strong, plain ends)		
2-in.	59	48½
2½-in. and 3-in.	63	52½
3½-in. to 6-in.	66½	56
Wrought Iron (same as above)		
2-in.	33½	15½
2½-in. to 4-in.	39	22½
4½-in. to 6-in.	37½	21

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	15.03	13.04	12.38
2½ in. O.D. 12 B.W.G.	20.21	17.54	16.58
3 in. O.D. 12 B.W.G.	22.48	19.50	18.35
3½ in. O.D. 11 B.W.G.	28.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Undsr 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Percent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Manganese	65¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	13.75†
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $14.25 in the St. Louis, Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-duty brick, St. Louis	$68.50
First quality, Pa., Md., Ky., Mo., Ill.	54.40
First quality, New Jersey	59.35
Sec. quality, Pa., Md., Ky., Mo., Ill.	49.35
Sec. quality, New Jersey	51.95
No. 1 Ohio	45.60
Ground fire clay, net ton	8.05
Silica Brick	
Pennsylvania and Birmingham	$54.40
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. in bulk	22.00
in sacks	26.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

	Per Gross Ton
Old range, bessemer, 51.50	$4.95
Old range, non-bessemer, 51.50	4.80
Mesaba, bessemer, 51.50	4.70
Mesaba, non-bessemer 51.50	4.55
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.768a	$3.922	$4.772	$3.605	$3.666	$3.822	$4.172	$5.816	$6.866	$7.072	$8.172
New York	3.59	4.613[3]	5.110	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.60	6.65	6.65	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	7.987
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.85	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.63	3.40	3.35	3.85	5.60	6.65	6.65	7.75
Detroit	3.45	4.50	5.00[4]	3.70	4.859[17]	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.65	7.90
St. Paul	3.50	4.46	5.257[4]	3.86	5.102[17]	3.81[13]	3.81[13]	3.76[13]	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.543	....	....	....	....
Indianapolis	3.518	4.568	4.918	3.768	4.741	3.63	3.63	3.58	4.00	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965[7]	4.66	5.268	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.358	4.308	....	4.158	4.158*	4.108*	4.729	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[3]	6.10[4]	4.95	5.813[15]	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.883	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.85[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.17[13]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$26.25	$26.75	$27.25	$27.75	....
Birdsboro	26.25	26.75	27.25	27.75	$31.25
Birmingham	20.75	22.13	....	26.75	....
Buffalo	24.73	25.75	26.25	26.75	31.25
Chicago	25.25	25.75	25.75	26.25	.....
Cleveland	25.25	25.75	25.75	26.25	.....
Detroit	25.25	25.75	25.75	26.25	.....
Duluth	25.75	26.25	26.25	26.75	.....
Erie	25.25	25.75	26.25	26.75	.....
Everett	26.25	26.75	27.25	27.75	.....
Granite City	25.25	25.75	25.75	26.25	.....
Hamilton	25.25	25.75	25.75	....	.....
Neville Island	25.25	25.75	25.75	26.25	.....
Provo	23.25	23.75	....	....	.....
Sharpsville [1]	25.25	25.75	25.75	26.25	.....
Sparrows Point	26.25	26.75	.....	.....	.....
Steelton	26.25	....	....	....	31.25
Swedeland	26.25	26.75	27.25	27.75	.....
Toledo	25.25	25.75	25.75	26.25	.....
Youngstown	25.25	25.75	25.75	26.25	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.75	$27.25	$27.75	$28.25	.....
Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$35.27
Brooklyn	Bethlehem	2.50	28.75	29.25	29.75	30.25	.....
Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	34.17
Canton	Cle,Yngstn, Sharpsvll	1.39	26.64	27.14	27.14	27.64	.....
Canton	Buffalo	3.19	.....	.....	.....	.....	34.44
Cincinnati	Birmingham	4.06	24.81	26.19	.....	.....	.....
Cincinnati	Hamilton	1.11	.....	.....	26.36	.....	.....
Cincinnati	Buffalo	4.40	.....	.....	.....	.....	35.65
Jersey City	Bethlehem	1.53	27.78	28.28	28.78	29.28	.....
Jersey City	Birdsboro	1.94	.....	.....	.....	.....	33.19
Los Angeles	Provo	4.95	28.20	28.70	.....	.....	.....
Los Angeles	Buffalo	15.41	.....	.....	.....	.....	46.66
Mansfield	Cleveland & Toledo	1.94	27.19	27.69	27.69	28.19	.....
Mansfield	Buffalo	3.36	.....	.....	.....	.....	34.81
Philadelphia	Swedeland	.84	27.09	27.59	28.09	28.59	.....
Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	32.49
San Francisco	Provo	4.95	28.20	28.70	.....	.....	.....
San Francisco	Buffalo	15.41	.....	.....	.....	.....	46.66
Seattle	Provo	4.95	28.20	28.70	.....	.....	.....
Seattle	Buffalo	15.41	.....	.....	.....	.....	46.66
St. Louis	Granite City	.50	25.75	26.25	26.25	26.75	.....
St. Louis	Buffalo	7.07	.....	.....	.....	.....	38.32

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50¢ a ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); Phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; Manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$31.25; f.o.b. Buffalo—$32.50. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Ferromanganese Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66% contained Mn. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point with freight allowed. Spot sales add 2¢ per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Spiegeleisen

Maximum base contract prices per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Low-Carbon Ferromanganese

Contract prices per pound of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, eastern zone. Add 0.25¢ for spot sales.

	Carloads	Ton	Less
0.06% C, 0.06% P, 90% Mn	23.00¢	23.40¢	23.65¢
0.10% max. C, 1% or 2% max. Si	23.00¢	23.40¢	23.65¢
0.15% max. C, 1% or 2% max. Si	22.00¢	22.40¢	22.65¢
0.30% max. C, 1% or 2% max. Si	21.00¢	21.40¢	21.65¢
0.50% max. C, 1% or 2% max. Si	20.00¢	20.40¢	20.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Electric Ferrosilicon

OPA maximum base price cents per pound contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Silvery Iron

Si 14.01 to 14.50%, $45.50 per G. T. f.o.b. Jackson, Ohio; $48.75 f.o.b. Keokuk, Iowa; $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per pound of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb, packed. Add 0.25¢ for spot sales.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

OPA maximum base price per pound of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add 25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
2000 lb-carload	3.80¢	4.20¢	4.25¢

Silicomanganese

Contract basis lump size, per pound of metal, f.o.b. shipping point with freight allowed. Add 25¢ for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
2000 lb to carload	6.70¢
Briquet, contract basis, carlots, bulk freight allowed, per lb	5.80¢
2000 lb to carload	6.30¢
Less ton lots	6.55¢

Ferrochrome

(65-72% *Cr, 2% max. Si*)

OPA maximum base contract prices per pound of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add 0.25¢ per lb contained Cr for spot sales.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	21.00¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

Ferrochrome Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60% contained chromium. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.35¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. Add 0.9¢ for central zone; 0.49¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2¢ for spot sales.

Shot or ingot	45¢

Ferroboron

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% Max. C.

	Eastern	Central	Western
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per pound of alloy, f.o.b. shipping point, freight charges allowed. Add 5¢ for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern	Central	Western
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern	Central	Western
11,200 lb or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

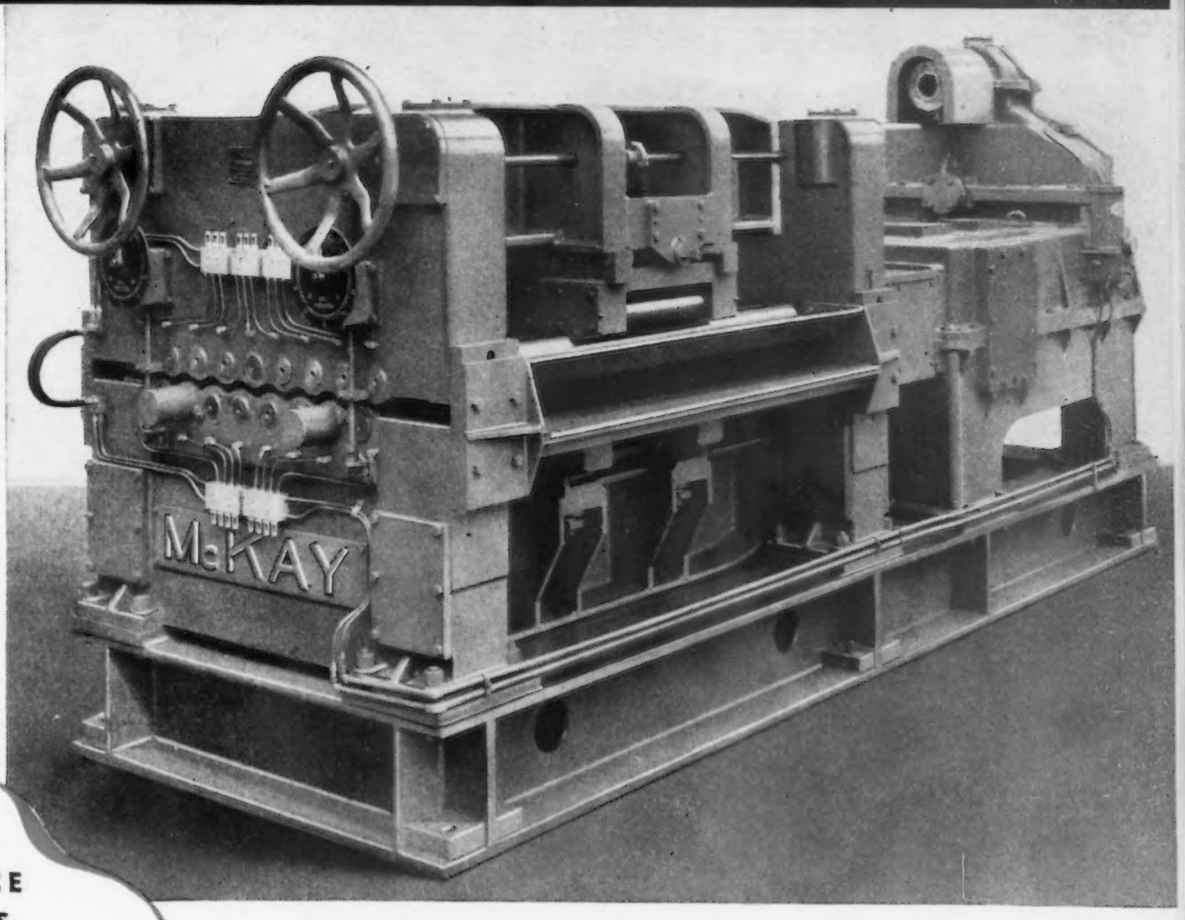
Ferrotungsten, standard grade lump or ¼X down, packed f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per pound contained tungsten, 10,000 lb or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, usual freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producers plant, usual freight allowances, per pound of cobalt metal	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per pound conatined V_2O_5. Spot sales add 5¢ per lb contained V_2O_5	$1.10
Silcaz No. 3, contract basis, f.o.b. plant with usual freight allowances, per pound of alloy.	
carload lots	25¢
2000 lb to carload	26¢
Silvaz No. 3, contract basis, f.o.b. plant with freight allowances, per pound of alloy.	
Carload lots	58¢
2000 lb to carload	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb and over, max. based on rate to St. Louis	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb	45¢
Less ton lots, per lb	50¢
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per pound contained Cb.	
2000-lb lots	$2.25
Under 2000-lb lots	$2.30
Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per pound contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed east of Mississippi, north of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo f.o.b. Langeloth, Pa., per pound contained Mo.	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per pound of alloy. Add ¼¢ for spot sales	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per pound of alloy	
Carload, bulk	4.60¢
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75¢
Ton lots	7.25¢
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

McKAY

BACKED-UP ROLLER LEVELERS

FEATURES

- Compact design reduces required floor space.
- All adjustments are readily accessible to the operator.
- Accurate indicating dials are provided for the screwdowns.
- Alloy steel Helical gears are used throughout—fully enclosed and running in oil.
- Drive is through Universal couplings.
- One-shot lubrication system (Optional.)
- Rugged construction insures continuous performance and low maintenance cost.



PERFORMANCE
RUGGEDNESS
PRECISION &
SAFETY

THE McKAY Backed-Up Roller Leveling Machine has extraordinary rigidity because its small diameter work rolls are supported by backing-up rolls. This type of leveling works the sheet more thoroughly.

Sheets processed on this type of leveler are strain relieved to a greater extent and have far superior stamping and drawing qualities than those processed by the ordinary leveler.

The **McKAY MACHINE** Company

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

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456 TERRACE **BUFFALO 2, N. Y.**

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

6000 Tons, Sandusky, Ohio, factory building for New Departure Div., General Motors Corp., to Fort Pitt Bridge Co.

3850 Tons, Marysville, Calif., (erroneously reported Jan. 10 as 400 tons) Feather River highway crossing, to Western Pipe & Steel Co.

3000 Tons, Smith Bluff, Tex., wharf for Pure Oil Co., to Carnegie-Illinois Steel Corp. through Stone & Webster Engineering Corp.

2700 Tons, Wilmington, Del., 3rd addition to Nemours Building, to American Bridge Co., Pittsburgh, through Turner Construction Co.

1600 Tons, Washington, transformer unit for Potomac Electric Power Co., to Bristol Steel & Iron Co., Bristol, Va., through Stone & Webster Engineering Corp., Boston.

1400 Tons, Tonawanda, N. Y., three factory buildings for R. Wulitzer Co., to American Bridge Co., Pittsburgh.

600 Tons, Bethlehem, Pa., addition to St. Luke's Hospital, to Bethlehem Steel Co., Bethlehem, Pa.

400 Tons, Kankakee, Ill., Armstrong Cork Co., factory building, to Midland Structural Steel Co., Chicago.

370 Tons, St. James, La., sugar mill for St. James Sugar Cooperative, to Ingalls Iron Works Co., Birmingham.

300 Tons, San Jose, Calif., Beechnut Packing Co., to Judson-Pacific-Murphy Corp.

200 Tons, Middle River, Md., test fixture building for Glenn L. Martin Co., to American Bridge Co., Baltimore.

200 Tons, Bedford Park, Ill., General Scientific Corp., building to Duffin Iron Co., Chicago.

175 Tons, Chicago, Pyramid Metals Co., manufacturing building to Duffin Iron Co., Chicago.

162 Tons, Glendale, Nev., highway construction, Nevada Dept. of Highways, to Bethlehem Pacific Coast Corp.

140 Tons, Kern Co., Calif., Cache Creek bridge, California Highway Commission, to Bethlehem Pacific Coast Corp.

118 Tons, Newtown Junction, Pa., plate girder bridge, to American Bridge Co., Pittsburgh, through Reading Co.

100 Tons, Detroit, Mich., office building for Chevrolet Gear, Axle & Forge Div., General Motors Corp., to Whitehead & Kales Co., Detroit.

Unspecified Tonnage, Atlanta, Ga., assembly plant for Ford Motor Co., to Steel Construction Co., Birmingham, Ala.

Unspecified Tonnage, Atlanta, Ga., assembly building for Buick-Olds-Pontiac Div., General Motors Corp., to Virginia Bridge Co.

• • • **Fabricated steel inquiries** this week were as follows:

8000 to 10,000 Tons, Boston, bearing piles for John Hancock Life Insurance Co., building.

3100 Tons, Point Pleasant, W. Va., Baltimore & Ohio RR bridge over Kanawha River.

2300 Tons, Edgewater, N. J., bearing piles for Seatrains, Inc., piers.

2200 Tons, Battle Creek, Mich., Michigan Carton Co., storage building.

1500 Tons, Milwaukee, fabricating shop, Chicago, Milwaukee & St. Paul & Pacific RR.

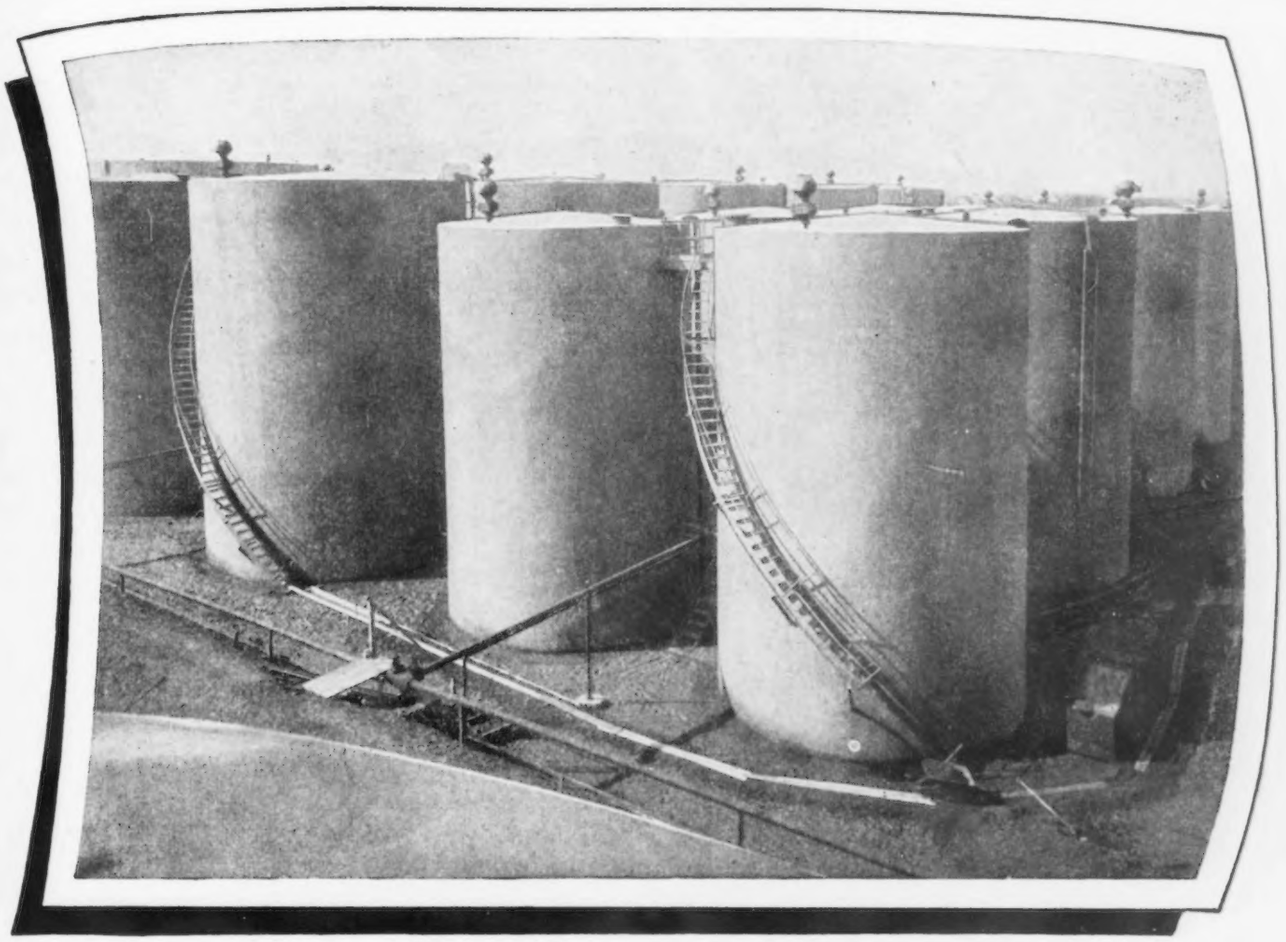
1372 Tons, Terminal Island, Calif., Freeway overhead crossing at U. P. RR tracks, California Div. of Highways, Los Angeles, bids due Feb. 7.

1000 Tons, Westfield, Mass., Anchorage Homes project.

800 Tons, Frankenmuth, Mich., Frankenmuth Brewing Co., bottling building.

800 Tons, Seagoville and Crandall, Tex., state highway bridge.

750 Tons, Texas City, Tex., Carbide & Car-



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General American has large shops and laboratories, X-ray, heat-treating and stress-relieving furnaces, a thoroughly-equipped field erection department. We believe we can give you the best service and the finest equipment you have ever experienced.

Write for any information you want.

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General Sales Offices: 513c Graybar Bldg., New York 17, N. Y.
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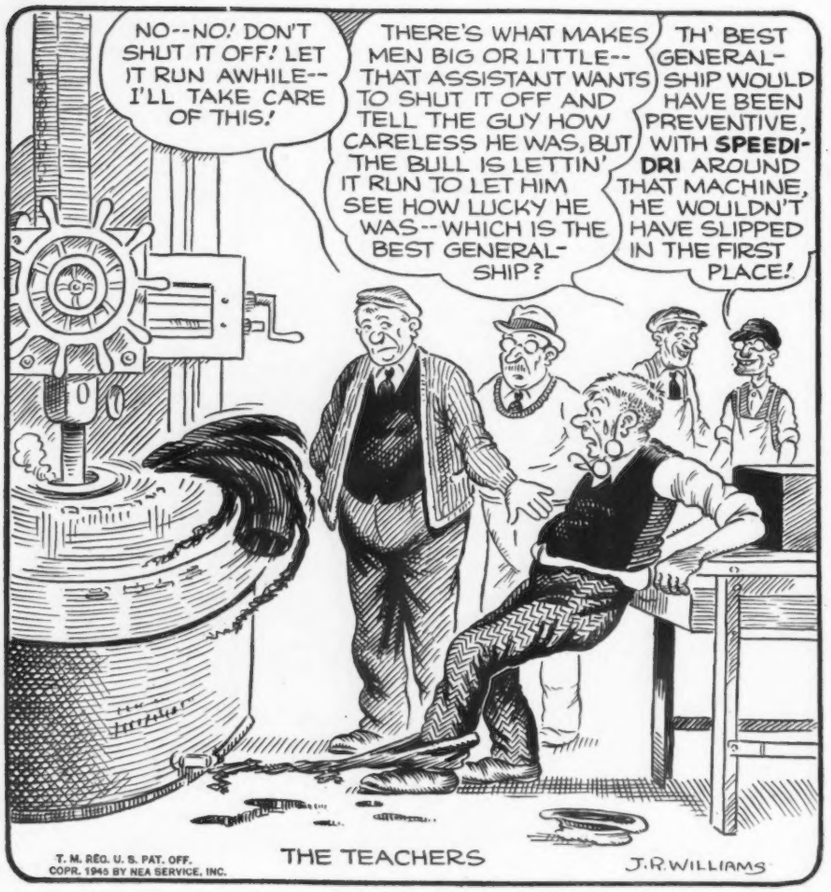
OUT OUR WAY


NO--NO! DON'T SHUT IT OFF! LET IT RUN AWHILE-- I'LL TAKE CARE OF THIS!
THERE'S WHAT MAKES MEN BIG OR LITTLE-- THAT ASSISTANT WANTS TO SHUT IT OFF AND TELL THE GUY HOW CARELESS HE WAS, BUT THE BULL IS LETTIN' IT RUN TO LET HIM SEE HOW LUCKY HE WAS--WHICH IS THE BEST GENERAL-SHIP?
TH' BEST GENERAL-SHIP WOULD HAVE BEEN PREVENTIVE, WITH SPEEDI-DRI AROUND THAT MACHINE, HE WOULDN'T HAVE SLIPPED IN THE FIRST PLACE!
T. M. REG. U. S. PAT. OFF. COPR. 1945 BY NEA SERVICE, INC.
THE TEACHERS
J.R.WILLIAMS

If your floors are slippery from oil or grease . . . if you're worried about falls or quick-spreading fire . . . investigate SPEEDI-DRI.

SPEEDI-DRI is quick, easy, inexpensive. It soaks up oil like a blotter takes ink. Thousands of industrial plants in all parts of the country are using it to save labor and money in floor-maintenance.

Easy to use. Just spread a thin carpet of SPEEDI-DRI, and it immediately provides a white, clean, non-skid surface to walk on and work on. Sweep it up with a stiff broom. It leaves floors clean, dry and *safe*.

SPEEDI-DRI works well on all types of floors. It requires no complicated, expensive machines; little labor; no dangerous caustics, solvents, or other compounds.

Write today for big, free sample and practical demonstration in your plant. SPEEDI-DRI for oils and grease . . . SOL-SPEEDI-DRI (the all-purpose product) for soluble oils, solvents, syrups, resin, and coolants, as well as regular oils and greases.

SUPPLIERS: East — Safety & Maintenance Co., Inc., New York 1, N. Y.
South, Midwest & West Coast — Waverly Petroleum Products Co., Philadelphia 6, Pa.

SPEEDI-DRI
OIL AND GREASE ABSORBENT

NEWS OF INDUSTRY

bon Chemical Corp., plant buildings.

700 Tons, Oakville, Iowa, state highway bridge.

700 Tons, Grand Rapids, Mich., American Seeding Co., factory building.

600 Tons, Wapello, Iowa, state highway bridge.

500 Tons, Cleburne and Cranbury, Tex., state highway bridge.

500 Tons, Columbus, Tex., state highway bridge.

400 Tons, LaGrange, Ill., Electro-Motive Div., power plant.

400 Tons, unnamed location, three transmission lines for Virginia Electric Power Co., Stone & Webster Engineering Co., Boston, engineers.

350 Tons, Lincoln Co., Ore., Fuller and Ojalla bridges over Siletz River, State Highway Commission, Portland, bids due Jan. 18.

325 Tons, Burbank, Calif., Walt Disney studios.

300 Tons, Chicago, Diamond Alkali Co., warehouse.

300 Tons, Crestview, Fla., U. S. Engineers office, hangar.

230 Tons, Keswick, Calif., 230-ton traveling crane, Keswick Power Plant, Central Valley Project, Bureau of Reclamation, Denver, Colo., bids taken Jan. 17.

180 Tons, Camden, N. J., coffee warehouse, W. S. Scull Co.

150 Tons, Columbia City, Pa., bridge, Pennsylvania Dept. of Highways.

130 Tons, Montgomery Cty., Pa., bridge, Pennsylvania Dept. of Highways.

• • • **Reinforcing bar awards** this week included the following:

5000 Tons, Pasadena, Calif., Bullock's Department Store, to Bethlehem-Pacific Coast Corp.

2200 Tons, Terminal Island, Calif., bridge to Terminal Island, to Bethlehem-Pacific Coast Corp.

1700 Tons, San Diego, Calif., four piers, to Bethlehem-Pacific Coast Corp.

800 Tons, Tyrone, Ky., Kentucky Utilities & Power Co., through Bates & Rogers, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

600 Tons, Santa Monica, Calif., Sears, Roebuck building, to Soule Steel Co.

500 Tons, Los Angeles, Calif., Gerry building, to Soule Steel Co.

500 Tons, Tonawanda, N. Y., Eastern States Cooperative Milling Corp., through James Stewart Corp., Chicago, to unknown producer.

400 Tons, Los Angeles, Calif., Cooper building, to Ceco Steel Products Corp.

400 Tons, Minneapolis, Minneapolis-Honeywell Regulator Co. structure, to Hustad Co.

360 Tons, North Stratford, N. H., bridge, to Truscon Steel Co., Boston, through Charles W. Riva, Inc., Boston, contractor.

350 Tons, Minneapolis, Minneapolis Star-Journal building, to Paper, Calmenson & Co., St. Paul.

348 Tons, San Jose, Calif., Beechnut Packing Co., to San Jose Steel Co.

300 Tons, Syracuse, N. Y., Carrier Corp., to Truscon Steel Co., Youngstown.

240 Tons, Wilmington, Calif., auxiliary service buildings, Harbor Steam Plant, Spec. No. 9137, to Bethlehem Pacific Coast Corp.

150 Tons, Pasadena Calif., National Technical Laboratories, to Soule Steel Co.

120 Tons, San Jose, Calif., J. C. Penney building, to San Jose Steel Co.

113 Tons, Glendale, Nev., highway construction, Nevada Dept. of Highways, to Bethlehem Pacific Coast Corp.

101 Tons, Kern Co., Calif., Cache Creek bridge, California Highway Commission, to Soule Steel Co.

• • • **Reinforcing bar inquiries** this week included the following:

850 Tons, Stockton, Calif., additions to State State Hospital, Div. of Architecture, Pub-

ARISTOLOY PRECISION-CONTROLLED
ELECTRIC FURNACE STEELS

HIT-THE-MARK

THE BEST IN ELECTRIC FURNACE ALLOY STEELS

BILLETS • BARS — rounds - hexagons - octagons

HOT ROLLED — FORGED — ANNEALED
HEAT TREATED — NORMALIZED
STRAIGHTENED — COLD DRAWN
MACHINE TURNED — CENTERLESS GROUND

STANDARD STRUCTURAL ALLOY

BEARING QUALITY

ALLOY TOOL

STAINLESS

SPECIALTY

NITRALLOY

CARBON TOOL

MAGNAFLUX-AIRCRAFT QUALITY

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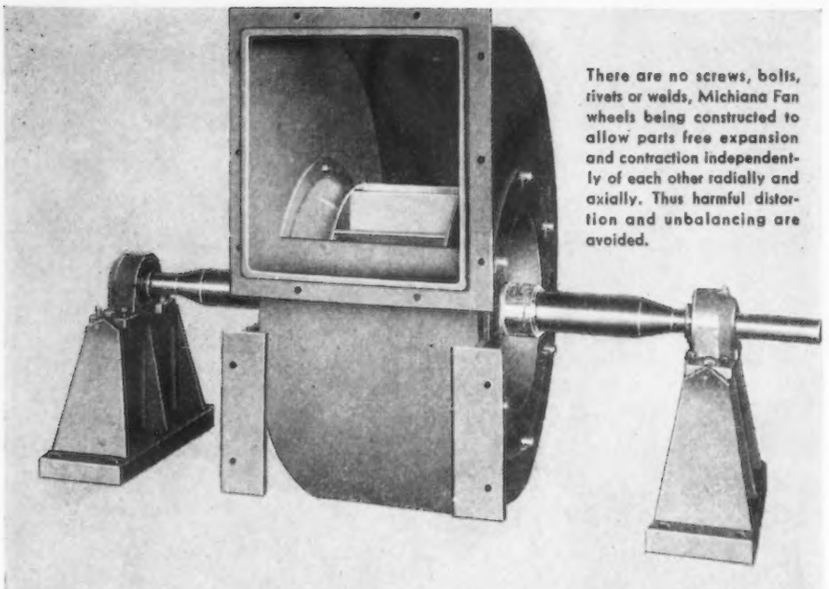
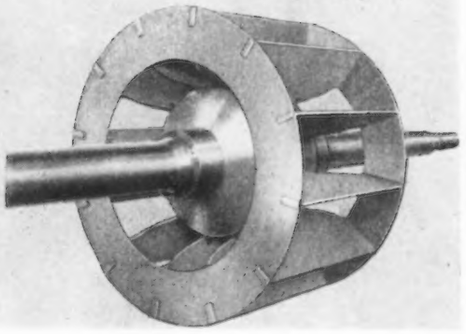


There are no screws, bolts, rivets or welds, Michiana Fan wheels being constructed to allow parts free expansion and contraction independently of each other radially and axially. Thus harmful distortion and unbalancing are avoided.

Longer Life High Temperature Fan



Designed especially for handling hot gases or products of combustion where temperature requirements range from as high as 1800° Fahr., Michiana Fans provide long-life continuous operating performance. The consistent uniformity of product, and improved output effected are well worth investigating now.

Michiana Fans of Michiana Heat-Resistant Alloys can again be produced, engineered to fit temperature and load requirements in capacities from 400 cu. ft. of air per minute.

For Special Applications

These fans, because of their design and construction, can be manufactured from any castable alloy and thus meet a wide variety of special requirements. For example, where abrasion is a factor, an abrasion-resistant alloy may be used; where resistance to corrosion is required—cast stainless steel may be employed. Thus MICHIANA FANS can be made of materials that cannot be produced in rolled form.

Our engineers are ready to make practical suggestions.
MICHIANA PRODUCTS CORPORATION, Michigan City, Ind.

MICHIANA
HIGH TEMPERATURE
FANS

Write for New Bulletin 645

lic Works Building, Sacramento, bids due Jan. 29.

350 Tons, Marcus Hook, Pa., oil refinery.

305 Tons, Whiting, Ind., Sinclair Refining Co. structure.

300 Tons, Iowa locations, Iowa State Highway Commission.

250 Tons, Wyandotte, Mich., Wyandotte Chemical Co., research laboratory.

230 Tons, Gary, Ind., Sears, Roebuck & Co. building.

170 Tons, Crookston, Minn., power plant.

170 Tons, Devils Lake, N. D., power plant.

162 Tons, Avon Lake, Ohio, Fruehauf Trailer Corp. building.

160 Tons, Annapolis, Md., Spa Creek bridge.

150 Tons, St. Paul, Minn., factory building, Donaldson Co.

131 Tons Great Falls, Mont., overpass over Great Northern R. R., U. S. Highway No. 91, Montana State Highway Commission, bids due Jan. 23

• • • **Sheet piling inquiries** this week included the following:

29,000 Tons, Porto Rico, Ochea Fertilizer Corp.

6700 Tons, Polish Supply and Reconstruction Commission.

• • • **Plate inquiries** this week included the following:

3450 Tons, American Fork, Utah, Salt Lake Aqueduct, Provo River Project.

420 Tons, Cedar Falls, Wash., replacing portion of Cedar Fall penstock No. 5, Board of Public Works, Seattle, bids taken Jan. 10.

Printing Machinery Gains 12% Price Rise

Washington

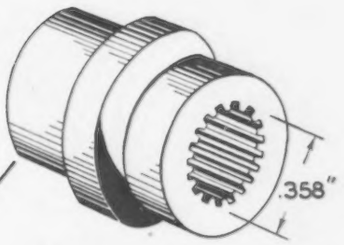
• • • **Made effective immediately,** OPA on Jan. 9 announced an increase of 12 pct in ceiling prices for printing trades machinery and equipment. The increase, OPA said, is designed to compensate manufacturers for increased factory wage rate schedules and material costs experienced since 1941.

This increase is applicable to printing machinery, mechanical accessories including repair and replacement parts, interchangeable parts, jigs, fixtures, workholding and position devices and rests, and mechanical equipment designed and sold exclusively for use by the printing trades. A four-page list of specific items covered is contained in the order authorizing the increase. Resellers will be permitted to pass on to buyers the dollar-and-cent amount by which the cost of the products they buy from manufacturers are increased.

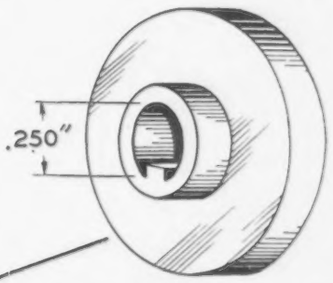
OPA said that the increase may be distributed by manufacturers between their direct sales to consumers and their sales to resellers so that resellers' prices will be the same as the manufacturers' list price for direct sales.

They're Everyday Jobs for the "Junior"

PULL BROACHING
(With Pull-Down Attachment)

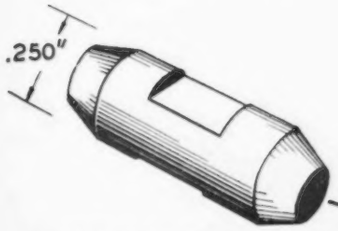


Broaching small splines in lever hubs.

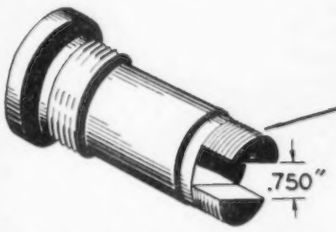


Broaching inverted .062 key in ¼" hole, ½" long.

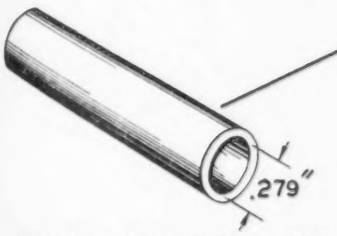
PUSH BROACHING



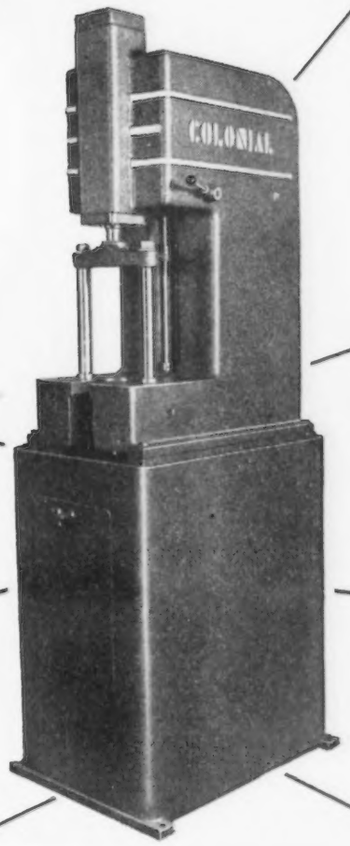
Straddle Broaching ¼" wide flats on ¼" diam. pivot pins.

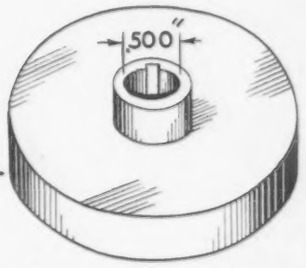


Burring slots in fuse bodies after turning and threading.

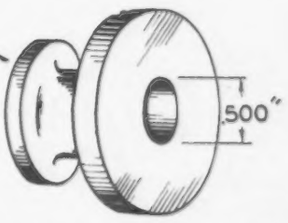


Finishing ID to .002 in 1-½" long seamless brass tubing.





Cutting .155 by .070 key-way ¼" long in ½" hole.



Removing .004 to finish a ½" hole, ¾" long.

In practically every shop there are "little" jobs—assembly, broaching, etc.,—which the Colonial "Junior" Press—with or without pull-down attachment, base type or bench type—can do quicker and better. Full hydraulic—available with variable speed and pressure controls. Capacities 1 to 4 tons; 12 inch stroke.

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DETROIT 13, U.S.A.

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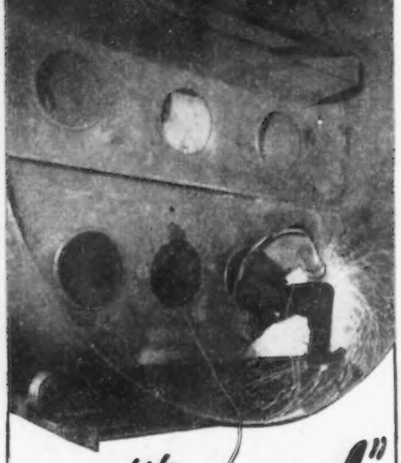

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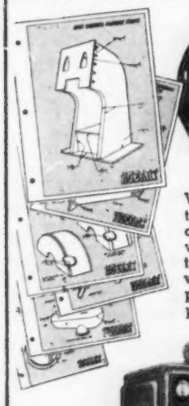
with Exclusive Remote Control

It's impossible for you to drag your welding machine down in the double-bottom of a "Victory" ship or high in the air on a big construction job . . . however, with a Hobart you can have the same fine adjustments of welding heats as if your machine was right at your side. Hobart's "Remote Control" is small and convenient enough to be carried anywhere. It allows you to make the correct heat adjustments for every application, whether it be overhead, vertical or horizontal welding . . . assuring you of sound, ductile welds at all times.

HOBART BROTHERS CO., BOX 153, TROY, O.



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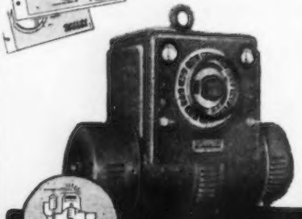

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"One of the World's Largest Builders of Arc Welders"

Plan of Soviet Steel Industry Calls For Ore, Fuel Treatments

New York

• • • **The new five-year plan** for the Soviet iron and steel industry contemplates eventual self sufficiency for its iron and steel needs according to a recent article in *Izvestia* republished in *Iron and Steel* (British). According to the author, I. Bardin, the underlying purpose of the development of our iron and steel industry in the next five years is, of course, to increase productivity of labor and output of metal to a level far exceeding prewar. The necessary increase in productivity may be achieved by progressively improving technological processes, increasing the capacity of installations, mechanizing operations, and perfecting organization. We will only touch upon the main trends in the solution of these problems, and once more repeat that we are concerned here only with the production of iron and steel intended for mass consumption.

Technological changes must, in our opinion, first and foremost take the line of enriching and standardizing raw materials and fuel. Improvement in the preparation of raw materials is urgent and essential if the efficiency of our blast furnaces is to be enhanced. This includes the crushing, grading and chemical and structural standardization of ore, agglomeration of furnace dust, and the grading and lowering the ash content of coke.

We are still backward in the matter of preparation of materials. Time was too short before the second world war for us to complete our program of reconstruction of our newer plants, with the result that the increase of blast furnaces outstripped installations for improved preparation of material. This discrepancy must be eliminated—this is one of the most important tasks in the coming five years. The new plants we are going to build must be equipped for the thorough preparation of ore and coal.

The next few years will see the development of a number of technological processes which, while not new, have not been adequately

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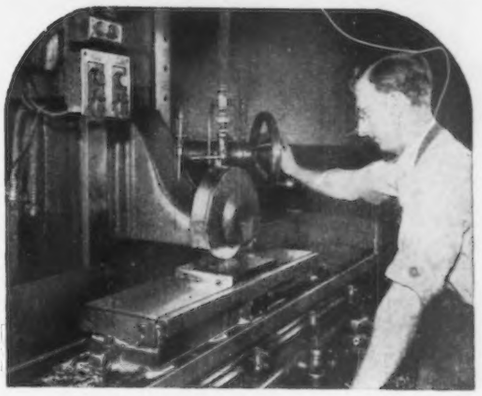
taken up in our country. One of them is the duplex process in its various combinations: Bessemer-openhearth, basic bessemer openhearth, bessemer-electric furnace, etc.

How will the increased capacity of Soviet iron and steel plants be achieved? Growing capacity of installations is the characteristic feature of modern iron and steel development. Our course must be to establish a minimum number of types of blast furnaces as far as volume and design is concerned, and to increase the proportion of big furnaces with a volume of 46,900 cu ft. The basic units in our steelmelting industry must be openhearth furnaces and converters with one-and-a-half times the capacity of the old ones. Increased capacity of iron and steel producing installations is the key to increased productivity. What is more, it will make it possible to reduce capital investment per unit of output.

As regards the necessity of establishing a minimum number of types of blast furnace, the immense value of standardizing installations and equipment generally should be mentioned. Standardization simplifies manufacture, facilitates operation and maintenance, and in the end reduces expenditure of labor. Our aim must be the maximum standardization of installations and equipment. Blast furnaces of 24,700, 35,300, and 46,900 cu ft capacity should be the basic types. Their equipment must also be standardized. Openhearth furnaces should be chiefly of 200 and 350 tons capacity, or, in the case of small plants, 100 and 120 tons; bessemer converters, 30 and 35 tons; and basic bessemer converters, 60 and 100 tons. We propose to standardize our blooming mills at capacities of 1,000,000 and 1,700,000 tons per annum. The continuous sheet rolling mill is the type which should be built most; at the same time we must widely develop the cold-rolling of sheet at high speeds.

Lastly, as to the mechanization of processes, iron and steel production with its huge installations and the vast amount of materials handled, is one of the most labor-consuming of all industries. Yet its processes have not been adequately developed in our country,

GRAND RAPIDS



YES

This Grand Rapids No. 55 Hydraulic Surface Grinder has been kept busy grinding base plates for cannon trays

BUT

today it is busy on peacetime production where extreme accuracy is required.

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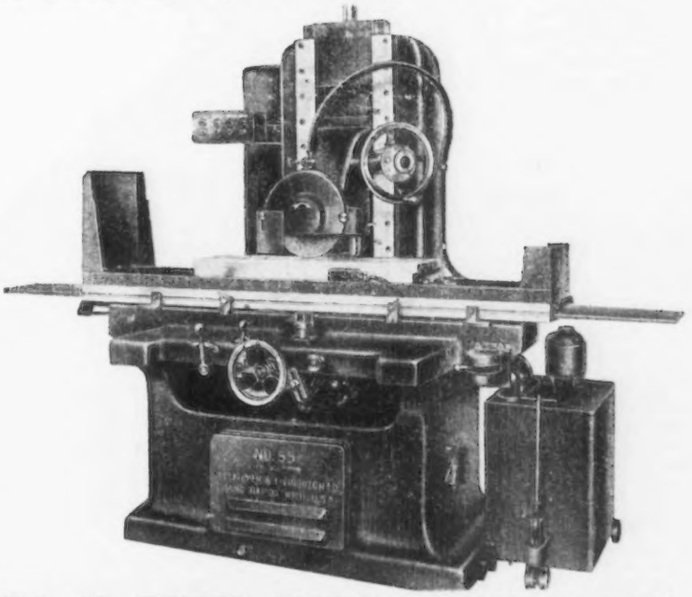

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especially in view of the acute shortage of labor.

Special attention will have to be paid to loading and unloading operations and to efficient transport facilities in shops, for the removal of finished product and waste, in ore-handling yards, warehouses, etc. Mechanization must be all-around, embracing all stages of production, from the unloading of the ore to the removal of the finished product from the plant.

An important branch of mechanization is automatic manipulation and control. Modern technique is distinguished by the extreme speed of its processes. The human being can no longer properly manipulate them and resort has to be had to automatic control instruments. The latter must be widely introduced in the next five years on rolling mills, openhearth furnaces, converters, etc.

Our industries are becoming more and more exacting in their demands for high quality and larger assortments of iron and steel goods. The larger the assortment the more efficiently and economically can metal be utilized.

Higher quality is particularly urgent in the production of steel for railways—rails, axles, tires, wheels, etc. We must not only produce heavier rails, but also subject them to proper heat treatment. Our steel producers must also help to reduce the weight of rolling stock by manufacturing suitable low alloy steels, hollow axles, and one-piece wheels of proper quality.

Our steel plants must put out goods in as finished a state as possible. Rails which leave the factory ready to be laid on the track are an example. Axles should be rough ground and sheets cut to required sizes. Our steel mills should also produce standardized parts of bridges, machines, etc. Such a division of labor between the metal producer and the metal consumer would be to their mutual advantage.

The above-mentioned measures, which characterize the main trends of technical policy in the iron and steel industry, will make it possible to reduce expenditure of raw material, fuel and power and, what is more, increase the labor productivity of the individual worker. The systematic carrying out of these measures will, in our opinion, enable our steel producers successfully to cope with the tasks set them by the Soviet government.

Wage-Price Unbalance Threatens Reconversion, Bank Survey Indicates

New York

• • • **Only to a very limited** extent, apparently, has the decline in war production been offset by an increase in the output of goods for civilian use, with the result that industrial production as a whole has dropped to the lowest level since the middle of 1941, states the Guaranty Trust Co. of New York in the current issue of the Guaranty Survey. The decrease in current production, however, does not accurately measure the recessions in industrial activity, employment and income. Many plants are going through what the Department of Commerce terms the organizational phase of the transition, during which a considerable amount of activity is generated that creates employment but does not find immediate reflection in the output of finished products.

Unemployment, accordingly, does not appear to have reached the levels indicated by earlier official forecasts, the Survey continues. Since a considerable part of the physical process of reconversion has already been completed, there are grounds for the hope that transitional unemployment will at no time attain the volume that was feared a few months ago. Whether this hope is realized will depend primarily on whether the remaining preparations for large-scale peacetime production can be made quickly enough to absorb a large proportion of the returning veterans, who have been reentering civilian life at the rate of more than a million a month.

More threatening is the outlook presented by the wage-price controversy and the general situation as regards industrial relations.

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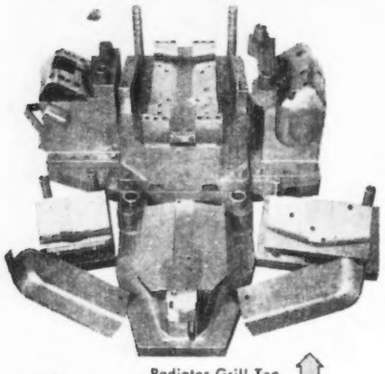

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The situation contains several potential elements of danger. If industry offers strong opposition to the wage demands, the consequence may be a series of strikes delaying reconversion for months. If wage increases are granted without corresponding price increases, the result will be that profit margins, already restricted by the government's reconversion pricing policy, will be further narrowed, and may prove insufficient in many cases to provide the necessary incentive to reconversion. If price increases occur, consumers who have not benefited by the higher wage rates may be unwilling or unable to buy freely, and there may ensue a consumers' strike similar to that which took place after World War I and which was partly responsible for the crisis of 1920-21.

It is still too early to appraise the long-term significance of the year's devlopments in the field of foreign trade. The rapid decline in lend-lease shipments has been accompanied by a moderate increase in commercial exports. But, with shipping still in great demand for military purposes, and with commercial and financial conditions in many foreign countries still in a very chaotic state, no clear idea as to the outlook is yet possible.

As far as can be judged from present indications and from experience after World War I, several years, at least, will be required for the determination of exchange parities, shipping allocations and other basic factors in the international trade structure. Meanwhile, the urgency of the need will probably result in a very substantial flow of goods from the United States to foreign countries, even in the absence of a permanently satisfactory background.

Foreign demand will be stimulated by the supply of dollars created as a result of commitments already made to foreign nations. Although orders from abroad will accordingly be large, the question arises whether the United States will be in a position to meet a demand made possible by the availability of dollars in large volume and at the same time satisfy its own pressing needs for goods.

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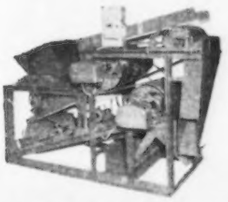
The Dings High Intensity Magnetic Pulley utilizes air-cooled construction and *bronze* spacer rings to provide complete, automatic separation. For use as head pulley in a belt conveyor system.



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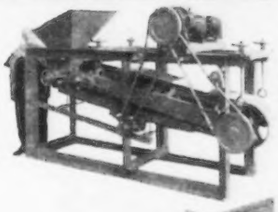

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Aluminum Production Increase Seen

New York

• • • In a study of the industrial future of aluminum the British publication *Light Metals* reports on a book on *Aluminum—An Industrial Marketing Appraisal* by several professors of the University of Washington prepared in cooperation with the Dept. of Commerce and the Washington State Planning Council. The volume treats all aspects of aluminum production, its industrial structure and markets, together with the authors' recommendations for public policy.

In an exhaustive questionnaire to determine the condition of the market, two hundred companies, past or potential consumers of light alloys, were interviewed. In the questionnaire firms were asked to show the influence of price per pound by giving figures of anticipated utilization at the two price levels of 15¢ and 10¢ a lb. The answers demonstrated that the demands of some industries were inelastic, and would not alter if either price ruled.

The authors' survey of the postwar market in the United States estimates that a total demand for 1.5 billion lb may result five years after the war. This demand is on the further assumption that virgin metal continues to cost 15¢ a lb. If, however, the price be reduced to 10¢ a lb, a total demand of 2 billion lb is possible. The total requirements include virgin and secondary metal the proportions given for the 1.5 billion lb demand being given at 900 million for virgin and 600 million for secondary. The tables reproduced, numbered 88 and 89 in the book, show the increase in consumption anticipated industry by industry, and the distribution of the forecast demand at the two price levels.

Each of the user markets noted in the tables referred to is considered in further detail in three chapters. Since the transportation market is the largest field, one chapter of 27 pages is devoted to

Estimated Annual Postwar Consumption of Aluminum*

(In thousands of pounds)

Industry	Price of Aluminum Metal	
	At 15¢ per lb	At 10¢ per lb
Total, all industries	1,429,629	1,890,300
Transportation	845,500	1,053,500
Automobiles	400,000	600,000
Buses	12,500	12,500
Truck trailers	.....	8,000
Railroads	368,000	368,000
Aircraft	65,000	65,000
Iron and steel and their products	350,000	450,000
Steel industry	250,000	250,000
Architectural, building construction	100,000	200,000
Electrical industries	93,644	135,450
Transmission lines	15,000	18,000
Electrical goods, manufacturing appliances and general equipment	49,165	64,525
Communications and related equipment	7,500	15,000
Floodlight and other lighting equipment	2,500	5,000
Radios		
(a) Low estimate	600	6,000
(b) Medium estimate	5,000	5,000
(c) High estimate	24,000	27,000
Regulators, switches, etc.	154	10,508
Washing machines	15,000	35,000
Miscellaneous electrical items	325	425
Nonferrous metal casting and stamping	50,000	100,000
Metal stamping	3,500	10,000
Cooking utensils	45,283	67,925
Machinery and related equipment	28,702	49,925
Air conditioning and refrigerating equipment	18,500	31,000
Business machines	2,200	2,750
Derricks and cranes	20	700
Engines, gasoline, diesel, steam, etc.	2,420	2,420
Mining machinery	250	300
Tire making machinery	2,000	5,500
Miscellaneous machinery	3,312	7,255
Miscellaneous industries		
Aluminum foil	15,000	15,000
Hardware	500	500

* Based upon field interviews with 135 consuming companies. The assumptions were made of complete conversion to peace with full employment in industry and national income of $110 billions at 1940 prices. The totals may be reached by the fifth postwar year.

Prewar Consumption of Aluminum, 1935-39, Average

Industry	Sales	
	Million Pounds	Pct
Total	257	100.0
Transportation	57	22.2
Automobile	25	9.7
Air	23	8.9
Rail	3	1.2
Other	6	2.3
Metal and metal products, nonferrous	41	15.9
Electric light and power companies	35	13.6
Cooking utensils	31	12.0
Electrical machinery, apparatus, appliances	26	10.1
Iron and steel and their products, except machinery	22	8.6
Blast furnaces, steel works, rolling mills	10	3.5
Architectural, structural, ornamental	8	3.1
Other	4	1.6
Machinery, except transportation	9	3.5
Air-conditioning, refrigeration, etc.	2	0.8
Business machines	1	0.4
Engines, gas, diesel, steam	1	0.4
Other	5	1.9
Chemical and allied products	7	2.7
Paints and varnishes	5	1.9
Sales to metal jobbers	15	5.8
Miscellaneous industries	14	5.6

The remaining 17 or 18 pct included sales to metal jobbers, to manufacturers of machinery of various types, to the paint and varnish industry, and to miscellaneous users.

considerations of the views expressed to the authors during their survey. In the automotive industry, possible requirements vary widely from company to company, but a general conclusion was that potentialities for light alloys in this industry were decidedly dependent upon price. While as much as 40 lb weight per car was used in some cases before the war, estimates by some automobile specialists gave up to 500 lb for a postwar product. Much depends upon the enthusiasm, or otherwise, of the engineer for light alloys. The influence of wartime experience in aluminum is exemplified in the case of a Detroit firm that had converted an iron foundry completely to aluminum casting for war production. It was felt that this experience would be transferred to postwar operations. The same foundry, however, thought that the price for virgin ingot would have to be 9¢ before any large use could be expected. Another executive wanted aluminum at 7¢, while one saw little hope for large consumption until the price was as low as 4¢ a lb.

Difficulties in fabrication were mentioned several times; there appears to be ignorance on welding processes for aluminum, although it is pointed out that the war has again given many operatives the necessary "know how." A second limitation of the material was due to the difficulty of deep drawing.

The authors' conclusions of market appraisal for aluminum in this field is given as 400 million lb using aluminum at 15¢ a lb for a production of 5 million cars having an aluminum-alloy content of 80 lb each. This market is somewhat elastic, so with a price of 10¢ a lb, it is estimated that 125 lb might be used in each car, and for an output of 5 million, 600 million lb of aluminum will be required. It is noted that these quantities should not be anticipated until three or four years after the war.

The position is very different when trucks and buses are considered, for weight saving means reducing operating costs and increased pay load. Extracts from engineers and executives of truck and bus producers are given here because of their interest and diver-

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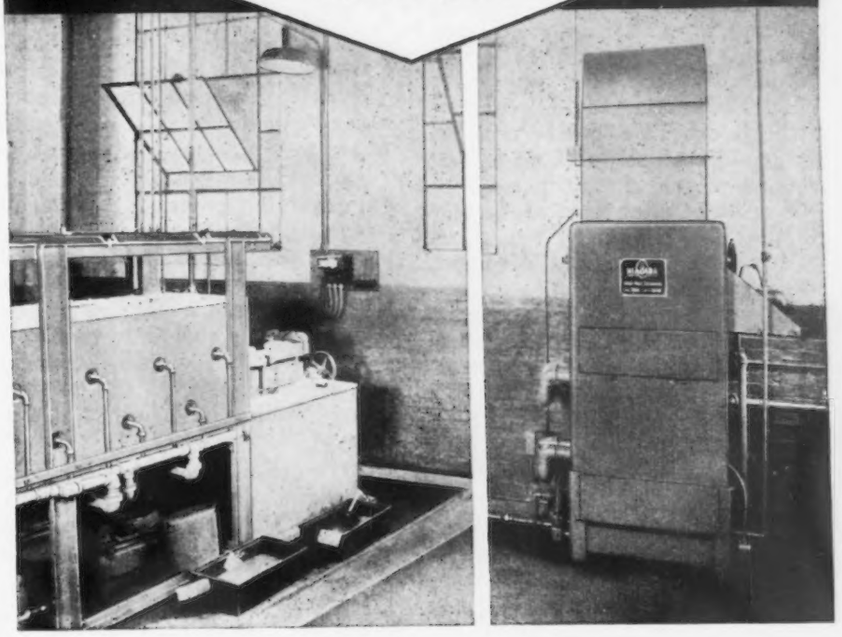

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gency of view. The chief engineer of a large company states that his "consumption of aluminum was about 1 ton per bus in the prewar period. At 10¢ a lb for aluminum we estimate an increase of about 50 pct in our consumption. On the technical side we find that aluminum extrusions offer a great advantage over steel. Also, cast aluminum wheels are fairly satisfactory, but pressed aluminum wheels can also be used now that a good hub cap can be made. Axle housings and similar parts could be made of aluminum if the techniques for repairs by truck-operating companies can be developed. The successful use of aluminum in truck and bus production depends to a large extent on getting the right alloy for the particular use."

Another engineer of a large truck and bus producer said: "The use of aluminum in trucks is very competitive, hence price is a factor. Most of the use of aluminum in buses and trucks has been in the construction of bodies. A large bus which holds 37 to 41 passengers may use 5200 lb of aluminum. We anticipate an increased use of aluminum in running gear and rear-axle housings; wheels may also be made of aluminum, but more research is necessary to develop them. Aluminum brake shoes have failed, and cast and malleable iron are used instead. Pistons can be made of secondary aluminum provided the same physical specifications can be met . . . it is preferable to rivet rather than to weld, but advancement is being made in the welding process . . . difficulty is that there is not a wide enough understanding to weld aluminum . . . riveting is better understood." This statement concludes by stating that this company is not prepared to take the risk of welding, as a failure of 2 pct of the welds made would put them out of business.

The president of a moderate-size truck-body plant stated that "a price of 10¢ a lb is low enough to make aluminum a preferred material."

A small truck company stated that they had not found aluminum to be a particularly satisfactory material because of atmospheric corrosion. Use after the war would depend upon what advances had been made in corrosion protection.

In consideration of the railroad and railway-car building industry, it was found that with but few exceptions the railroads were not convinced of the superiority of aluminum in rolling-stock construction. Another opinion that aluminum was definitely superior to other materials for passenger and freight cars from the technological and economic aspects; again, one car builder advocated the superiority of stainless steel. The president of a large car-building company stated, among other things, that design considerations must be carefully considered, particularly with respect to the low modulus of elasticity of aluminum, but because of the lightness and strength of the alloys used, it was possible to hold deflections within the range of that of a structure using light alloy, still effecting weight saving, but also actually providing greater strength. He mentioned again that welding of aluminum is not without its difficulties but expected that they will be overcome as research develops methods.

Of interest is the statement of another authority that aluminum could be used to increase the water capacity of locomotive tenders, so eliminating stops for water pick-up, reducing overall time and operating expenses. Another official of a car-building company stated that the rapid development of plastics has given reason to consider the replacement of aluminum by plastics in some conditions, but that no definite conclusions had been reached.

A definite engineering problem in the use of aluminum in railway cars is mentioned in another reply as follows:—" . . . brake shoe capacity. A standard rule is that brake-shoe pressure has to be 60 pct of the weight of the car, in order to be able to stop the train. If the weight of a freight car is lightened by 10,000 lb from its original 40,000 lb, the brake-shoe pressure must still be 60 pct of the

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weight of the car. But when the car is loaded, the braking equipment is insufficient to do the job. On the other hand, heavier braking equipment on a lighter car would slide the car wheels when the engineer tried to stop the train. Thus, a different solution must be sought which adds to the cost of the brakes. Railroads think a long time before they will pay extra for both aluminum and brakes. It is argued also that there is not much saving in coal for locomotion, even if freight cars are lightened by the use of aluminum. As coal and fuel oil are both cheap, railroads have not been interested in arguments in lighter equipment."

The authors met a difficulty in appraisal when they considered the aircraft industry, because the industry itself remains doubtful of its own future. Aluminum and magnesium will undoubtedly remain aircraft materials, but the amount of aeroplane production in postwar years is so uncertain that difficulty was experienced.

Turning to architecture and building construction, the authors evolved an estimate for the postwar market of 100 million lb weight at 15¢ per lb to 200 million lb at 10¢. In the words of one interviewee: "a large use was anticipated for window frames and other structural parts as well as for decorative effects. A new electroplating process for chromeplating on aluminum is expected to open up new uses for decorative purposes in building."

In passing, it is worth noting that 17 pct of the surface of Rockefeller Center in New York is aluminum, the total amount in the building amounting to 1500 tons.

Another building opinion is that aluminum has very definite advantages over steel for casement windows in dwelling houses, for aluminum alloys do not stain and do not require frequent painting for upkeep.

In a comprehensive review of the possibilities of light alloy application to plumbing, the official of a large company specializing in the production of such requisites made the point that the public, having been educated to glass-like cleanliness of enamelware and

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pottery, is not likely to take kindly to aluminum sinks and plumbing fixtures in general, unless a finish for aluminum is developed to give equal or better surfaces than the accustomed finish of the usual materials.

Saving in freight charges is mentioned several times as a further inducement for the consideration of aluminum in such goods as heating radiators, valves and fittings, and soil, sewer and water pipes.

The electric light and power companies have been important users of aluminum in the form of overhead cables, but future demands depend upon postwar conditions. Given full employment and industrial prosperity, new power lines may have to be erected; should serious unemployment follow the war, new lines may be installed as part of a public works program. An official of the U. S. Dept. of Commerce stated that in the choice of cables for transmission lines "weight and price become the deciding factors." The demand, therefore, is elastic to some extent. Final computation gave aluminum sales of 20 million lb at 15¢ per lb, and 24 million lb at 10¢ for an annual construccion of 10,000 miles.

A manufacturer of electric fixtures was enthusiastic about aluminum, writing in the following terms: "The company appreciates aluminum now that they cannot get it. When the company had to change over to steel for lighting it found that steel was more expensive than aluminum. In the case of aluminum, all that the company had to do was to form it, then alzate it and that was all. In the case of steel, the company had to form it, clean it, electroplate it and paint it. Steel may just be plated, buffed and polished and then lacquered, but this is still more expensive. For fluorescent lighting, aluminum is just right. It should be used for industrial lighting, but the industry has built up porcelain enamel steel and it is hard to change over to aluminum. The company was unsuccessful in spotwelding, but it got around this by riveting its aluminum products."

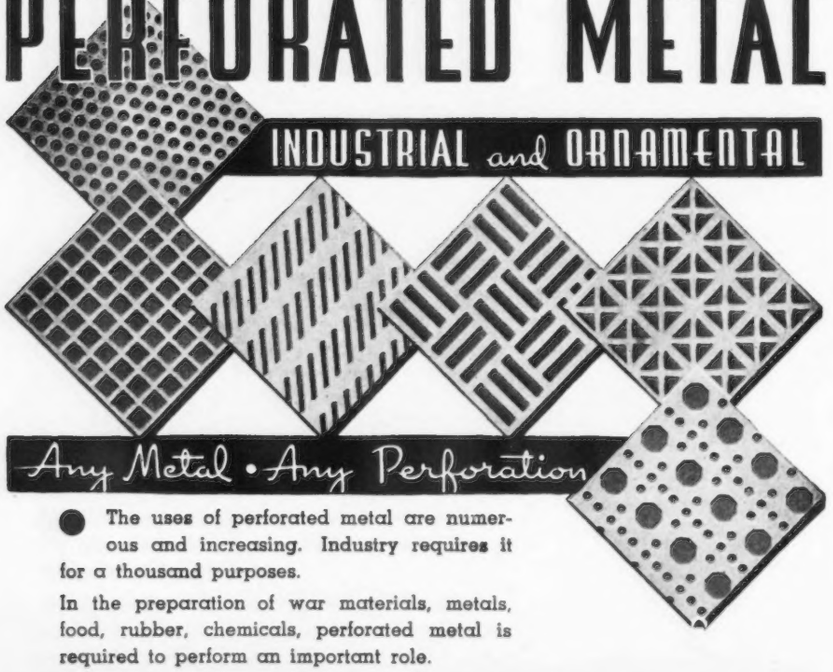
The authors consider the influence of magnesium on postwar markets. A chapter deals with the history, production, processes and markets of magnesium alloys. First in the authors' conclusions is the difficulty of assessment of magnesium's postwar place, for the large wartime production has been utilized in plane construction and pyrotechnics, including incendiary bombs. The public, therefore, has had little chance to become familiar with the metal.

The present price of 20½¢ per lb makes the material economically comparative with aluminum and, for some uses, with steel and copper, but a lower price would encourage experimentation. A price as low as 10¢ a pound was envisaged by some enterprising concerns shortly after war.

Over 100 reports of the field survey gave definite answers to questions relating to probable consumption of magnesium. Of these, 77 reported that no use of magnesium was contemplated in postwar years, reason being a frank admission of "no knowledge," together with detailed reasons why magnesium was unsuitable for specific industries. Fire risk and corrosion were mentioned several times; nevertheless, with certain reservations, 28 companies said they would use greater or less amounts of magnesium after the war.

Brief reports of the 28 companies' replies are given. For our purpose, disadvantages cited will be listed first: These are given as explosion risks in melting and casting, lack of strength, difficulties in heat conditions, corrosion, especially in salt atmospheres, high coefficient of thermal expansion, and poor machinability. Favorable factors encouraging increased use of magnesium were given as follows: Good machinability, strength at high pressures, low specific gravity and corrosion resistance to some chemicals. Many replies stated that no technical limitations had been found with respect to a particular job; others, again, cautiously stated that experience was limited.

PERFORATED METAL



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Standard models of machine tool coolant pumps are shown in this catalog. The pumps are described and tables are given showing dimensions and capacities. The booklet also shows various brackets and tanks for use with the pumps. Price lists are also included. *The Ruthman Machine Co.*

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(6) Wire Trays:

Folder features the company's precision-fabricated wire cloth unit-handling fixtures for all industrial purposes, with a few suggestions of the many possible designs of industrial baskets, accompanied by many pictures. *Ludlow-Saylor Wire Co.*

(7) Centro-Matic Lubrication:

The many advantages of the company's Centro-Matic lubricating system for preventing damage to bearings are outlined in this booklet. The lubricating cycle is sketched and described along with the different stages of operation and the three types of systems. *Lincoln Engineering Co.*

(8) Electronics:

Booklet briefly describes a few of the company's developments including hermetic seal, vacuum switches, spertifier, sun lamps, etc. Standard design specifications and installation advantages are also listed. *Sperti, Inc.*

(9) Metal Tubing:

The different applications of the firm's flexible metal tubing are both pictured and described in this folder. Information on Solseal, Metseal, Heatproof and Soldered-on couplings is also given. The folder is written in English, Spanish and Portuguese. *Pennsylvania Flexible Metallic Tubing Co.*

(10) Forgings:

64-page pictorial brochure which takes you through the Worcester and Harvey plants of Wyman-Gordon and shows their line of modern machines in action. The die shops, forge shops, laboratories, shipping and engineering depts., are a few of the many places covered in the booklet. *Wyman-Gordon.*

(11) Isothermal Diagrams:

Catalog of 56 isothermal transformation diagrams, in standard form and size, represents a total of 47 different steel compositions. They are grouped in seven sections, each group of diagrams being preceded by pertinent remarks. Also several pages are devoted to the significance of the isothermal transformation diagram of a steel. *U. S. Steel Corp.*

(12) Screw-Machine Products:

Folder lists the company's complete parts manufacturing facilities which include automatic screw machines, turret and engine lathes, milling machines, plating, grinding and others. *U. S. Automatic Corp.*

(13) Forging Equipment:

Leaflet contains brief information on the company's line of modern forging equipment, stressing in particular steam hammers, upsetters and mechanical and hydraulic presses. *Canton Drop Forging & Mfg. Co.*

(14) Air Compressors:

Catalog presents descriptions and data on the standard types of the company's portable and stationary air compressors for industrial installations, along with color photos, compressor and engine specifications, skid mounting tables and other dimension tables. *Schramm, Inc.*

(15) Tool Grinders:

Detailed information and complete specifications on the firm's No. 70 and No. 80 hydraulic feed universal and tool grinders, accompanied by descriptions of the different detachments are covered in this booklet. Also given are the various effective methods of grinding. *Gallmeyer & Livingston Co.*

(16) Steel Shelving & Lockers:

Two catalogs — one giving comprehensive pictures and descriptions of a wide range of modern lockers, together with specifications, construction details and locker equipment; the other giving similar data on open and closed type ledge shelving. *Penn Metal Corp. of Penna.*

(17) Welding Cable:

General construction details of rubber cables, the physical properties of rubber installations, and its resistant qualities are featured in this booklet. *Welding Engineering Co.*

(18) Oil Gages:

A description of a newly-developed line of oil gages is covered in this release, with particular attention called to the fact that they have an unbreakable sight, thus avoiding the usual hazards of glass and also offering unlimited visibility. *Oil-Rite Corp.*

(19) Machinery:

A new bulletin describes industrial machinery, castings, mining machinery, marine winches and specialized industrial products. The bulletin also shows the company's facilities for manufacturing products on contract or building special equipment. *Lake Shore Engineering Co.*

(20) Boring Chuck:

Catalog completely describes and includes specifications of a new boring chuck with which you can center drill a hole, bore a hole and then drill again without removing the boring chuck. It also describes how it may be used as an adaptor for most any special tool. *De Soto Tool Co.*

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature. The offer is good for only two months.

1/17/46

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(21) Grinding Accessories:

Illustrated booklet on grinding wheel accessories for portable tools covers abrasive accessories for welding, blacksmith, pipe and structural work as well as for building and contracting industry. Guide to grain and grain selection is also given. *American Emery Wheel Works.*

(22) Piping Supports:

Booklet gives many details concerning standard and special types and sizes of functional spring hangers and vibration eliminators, with instructions for their installation, and engineering information which will be of help when adoption of this type of support is under consideration. *Blaw-Knox Co.*

(23) Hydraulic Presses:

Well-illustrated book acquaints you with the diversified manner in which H-P-M self-contained hydraulic presses have revolutionized production techniques and cut costs and describes the results of 68 yrs of specialized hydraulic pressure applications. *Hydraulic Press Mfg. Co.*

(24) Gear Finisher:

Four-page bulletin describes the latest model 861-4B Fine Pitch Rotary Gear Finisher, designed specifically for the rapid finishing of small gears to extremely close tolerances by the crossed-axis principle of gear shaving. Complete machine specifications, together with a list of the standard and special items are also included. *Michigan Tool Co.*

(25) Transmission Equipment:

Pictorial brochure shows the expansion of the Falk Corp. since its inception in 1892, with a special look into its research laboratories. Various transmission equipment and other products produced by Falk are illustrated and described. *Falk Corp.*

(26) Hardware and Fittings:

Catalog illustrates the special stainless steel hardware and fittings (both screw and sanitary types) which the company carries. Pages of stock sizes and schematic sketches are included. *Industrial Steels, Inc.*

(27) Torque Values:

Booklet containing tables of torque values for general assembly, automotive assembly and the proper tensions for hacksaw blades. Charts include tables for converting foot pounds to inch pounds. The booklet also illustrates the principles of torque tightening as applied in various types of industrial assembly, inspection, maintenance and service. *Jo Mfg. Co.*

(28) Tool Bits:

Booklet describing the company's complete line of high speed tool bits and Lamite cutting tools. The first section is designed to simplify the selection of the proper high speed steel bit for any application, and the second section gives complete details on Lamite cast alloy cutting tools; also complete information on grinding Lamite tools. *Vanadium-Alloys Steel Co.*

(29) Cutting Electrodes:

This new bulletin on Ellpro cutting electrodes gives complete details and specifications, together with a fully illustrated description on how to use the electrodes. Also describes the Palmgren arc oxygen kit for underwater cutting used with Ellpro cutting electrodes. *Ellwood Products Corp.*

(30) Non-Ferrous Melting Furnaces:

This 16-page bulletin describes high-speed, precision melting of non-ferrous metals in induction furnaces. Both lift-coil and tilting-coil types of furnaces are illustrated and fully described. Of particular value are helpful hints in planning an efficient foundry and a table showing proper equipment to maintain any given production schedule with red brass, copper, yellow brass, aluminum, magnesium, gold, or silver. *Ajax Electrothermic Corp.*

(31) Production Tools:

A profusely illustrated brochure outlining Allied's history from its days of pioneering to its present position. Illustrations show the interiors of the four plants and their many machines for manufacturing tools, dies, jigs, fixtures, plastic molds, hardened and precision ground parts, cold forged parts, bolts, cap screws and special production tools. The R-B Interchangeable Punch and Die is featured and its use and functions pictorially explained. *Allied Products Corp.*

(32) Utility Hydraulic Presses:

A two-color folder describing "Utility" hydraulic presses giving specifications, installation, dimensions, and a complete description of the standard line of machines. Also contains action photographs showing the "Utility" press at work on a variety of typical jobs. *Colonial Broach Co.*

(33) Industrial Furnaces:

A series of catalogs listing the advantages and containing specific information on several types of industrial furnaces—oven furnaces, oil-fired, electric and gas-fired; roller hearth furnaces, gas, oil and electric; and Kleenmetal oven furnaces, gas, oil and electric. *W. S. Rockwell Co.*

(34) Dryphoto Machine:

This booklet describes Ozalid machines. All ten types of prints made by this machine, and their uses are illustrated and explained. *Ozalid, Div. of General Aniline & Film Corp.*

(35) Air Conditioning:

Lintern aire-rectifiers protect health, provide 85° F. cab temperature, remove noxious gases, smoke, fumes, and oil vapors, and increase production wherever excessive temperatures make intolerable working conditions. Illustrations and detailed descriptions are found in this bulletin. *Lintern Corp.*

(36) Journal Box Lubrication:

Modern ingenuity produced the Stapax Lubricator to meet operating demands. There is a size and shape for any journal box now using waste. Stapax is made of a special quality of felt, controlled by a "spider" that holds it securely in place. It cannot develop loose ends, and it saves oil. This folder describing the many successes of Stapax also illustrates its installation in the average journal box. *Lubrication Products Co.*

(37) Hand & Power Chucks:

Catalog No. 58 is a complete catalog of standard chucking equipment, covering hand and power operated chucks, and machine vises. This catalog is divided into sections with illustrations, descriptions and engineering data. *Skinner Chuck Co.*

(38) Copperweld Wire:

This booklet contains the story of a very unique material, Copperweld, the only copper-covered steel wire and rod made by the Molten-Welding process, in which a heavy copper covering is permanently and continuously welded to a strong alloy steel core. *Copperweld Steel Co.*

(39) Thread Grinders:

Grindall portable, precision grinders are high precision tools, designed and built especially for precision work. This folder lists specifications for Model M ½ hp grinder, Model R 1 hp grinder, and the Model K 2 hp grinder, and gives details of spindle construction. *Walz & Krenzer, Inc.*

(40) Saw Blade Grinders:

Illustrations and instructions for operation are contained in this folder relative to saw grinders. *Espen-Lucas Machine Works.*

(41) Silicones:

Silicone compounds, greases, fluids, varnishes and resins, as well as silicone rubber are described in this bulletin. *Dow Corning Corp.*

(42) Collets and Chucks:

A collection of several approved data sheets with illustrations, diagrams, and charts on collets, chucks, adjustable floating holders, taps, expanding mandrels, and precision collets. *Erickson Tools—Div. of Erickson Steel Co.*

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Asks Wear Standards To Evaluate Vehicle Service Retirement

Detroit

• • • **Modern commercial** motor vehicles appear to be approaching the ideal of the "one hoss shay" —operating until collapse—it developed at the transportation and maintenance session of the Society of Automotive Engineers Annual Meeting.

A symposium on retirement of commercial vehicles disclosed that reasons for retirement are multiple, and complicated by diverse factors. It was proposed that SAE undertake preparation of wear standards for the guidance of fleet managers confused by vehicles which, running for hundreds of thousands of miles, seem to spurn time, distance, and wear.

Gavin W. Laurie, of the Atlantic Refining Co., Philadelphia, reported that preventive maintenance keeps motor vehicles in safe operating condition for more than a decade and a million miles. He declared that reasons other than mechanical failure and wear must be found for retirement, among them changing economics and service requirements.

Howard L. Willett, Jr., of the Willett Co., Chicago, described the functioning of a system of evaluating depreciation on a weekly basis so that a vehicle can be replaced when the cost is recovered. He explained that service conditions vary greatly; some vehicles may be retired after 80,000 miles, others will run for six or more years.

Competition was reported by W. A. Taussig, of Burlington Transportation Co., Chicago, as the pertinent factor for retirement of motor buses. Mr. Taussig explained that the public will patronize lines which offer more luxurious, comfortable, and modern equipment, and thereby will force the retirement of vehicles still capable of long service. He expressed the opinion that obsolescence is the primary factor in retiring motor buses.

Several of the multiple factors for retirement were discussed by Donald K. Wilson, of New York Power & Light Corp., Albany, who listed among them depreciation policy, operating conditions, main-

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Sizes up to 1¾ in. diameter, all commercial heads and lengths. Materials include low-carbon steel, boiler steel, structural steel, copper-bearing steel, wrought iron. Annealed, high strength, close tolerance and other special properties where desirable.

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tenance policy, geographical concentrations, market conditions for new and used vehicles, and mechanical condition.

Stressing mechanical condition as more important, Mr. Wilson described the urgent and growing need for reliable methods of evaluating the economic life of commercial vehicles and component parts. He asserted that development by SAE of parts wear standards would provide fleet managers with motor vehicle actuarial tables which would be proper yardsticks for mechanical condition and provide clues to retirement.

Reviews War Activity; Points to Peacetime Long Range Research

Wright Field, Ohio

• • • **During 1945, the Air** Technical Service Command, scientist and buyer for the Army Air Forces, returned $12 billion to the U. S. Treasury and turned to a future of aviation research designed to insure American military security, according to Lt. General Nathan F. Twining, Commanding General.

AAF expenditures, through ATSC, during the war totaled some $36 billion. Shortly after Pearl Harbor, ATSC procurement amounted to $5 billion a month, and as 1945 drew to a close this monthly sum had been cut to $80 million.

As of November 30, ATSC had terminated more than 24,000 contracts. The contract price of the items cancelled was $23 billion, and all but 5,365 had been settled with a fair return to the manufacturers who performed wartime miracles of production.

In research, the command's engineering division shifted its emphasis from development to longer-range research in such fields as the aerodynamics of supersonic speed, means of aiding the human body to stand the forces of such speeds, development of propulsive forces capable of supersonic flight and pilotless aircraft, the apparent key to the push-button warfare of the future. ATSC coordinates its research and development activities with the research programs of other governmental agencies and private industry.

Of the engineering division's 3000 active research and development projects current VJ-Day, 13 pct have been abolished. Bulk of the abandoned projects dealt with development of equipment for immediate use in combat theater.

Not only has the shift saved money which would have been spent for development of equipment that would have been outmoded in any future war, but it also freed manpower and materiel for research into the many problems of future security. More than ever before future national security rests with an efficient research and development program, for the time lag between idea and reality may be the margin of victory or defeat, ATSC officials said. That time lag was vitally important in World War II. With the development of the atomic bomb, pilotless aircraft and robot missiles, the probable time of war has been cut to a matter of days, it was added.

A summary of ATSC activities during the war and since VJ-Day reveals some of the scope of what it took to defeat the Axis. For example, a total of 228,000 Army aircraft was produced, including 16,000 gliders. Before VJ-Day, production had already begun to decline from a monthly rate of about 5000 to 3000 airplanes, and by December 1945, the rate had reached a level of approximately 150 aircraft per month. For the year 1945 a total of 35,000 aircraft were produced, but of this total only a trickle came after VJ-Day.

In a report presented to Congress, Oct. 29, 1945, approximately $5 billion worth of AAF property was reported as surplus, for sale to private industry or other disposal. Of the 43,240 plant clearance cases handled by the AAF between October 1944 and November 1945 inclusive, all but 6027 have been cleared and only 113 of the uncleared cases have been pending for more than 60 days. Almost 14,000 of these cases have arisen since VJ-Day with about 8000 having been cleared since that date.

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Alcoa Increases Sales Offices in Program To Expand Peace Markets

Pittsburgh

• • • **The Aluminum Co. of America** has announced plans for the opening of 11 new regional sales offices and is planning to open five more, some in areas where there was previously no direct sales representation. With the aluminum production capacity in the United States twice the total world consumption in 1939, the company is putting into effect intensified 1946 sales campaigns to promote the greatest possible use of the metal.

As evidence of the growing acceptance of aluminum for new applications the industry will depend for volume, in part, upon applications comparatively little known till now in a number of the nation's largest industries. "New types of roofing sheet to tap a tonnage market are now being introduced to the building industry, and are expected to account for hundreds of millions of pounds," according to Roy A. Hunt, president. "A new aluminum roof now nearing completion for the Union Terminal at Cincinnati will require 85,000 lb of the metal.

"The railroads, seeking modern, more attractive and lighter equipment, are specifying aluminum in many applications for 1946. Of 1100 rail passenger cars now on order, 160 will be of aluminum construction, and the others will average between 2000 and 10,000 lb of aluminum per car. Alcoa sales engineers are also calculating the lightening of such specialized railroad equipment as trucks, brakes, air conditioning equipment and lighting systems.

"Even locomotives in 1946 will employ large amounts of the light metal. The Pennsylvania Railroad has 50 new type locomotives under construction which will average 10,000 lb of aluminum each for cabs, walkways and boiler coverings. Other forms of transportation, such as trucks, trailers, buses, and airplanes will employ large quantities of aluminum.

"Among smaller items already in volume production is a line of aluminum canoes weighing only one-half to two-thirds as much as their counterparts made of other

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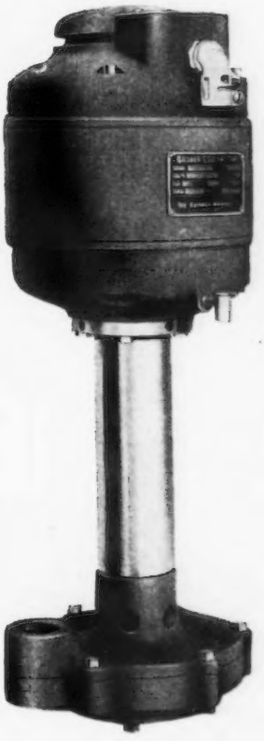

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materials. Some of the new packaging applications developed during the war will have postwar applications. Aluminum caps and seals made for penicillin bottles will have peacetime counterparts in packages designed for pharmaceuticals, while heat-sealed aluminum foil envelopes used during the war will protect and display such products as dehydrated soups and powdered fruit juices.

"The industry's ability to satisfy all new markets speedily and thus create the greatest possible number of jobs will be influenced by labor and other conditions in consuming industries. While the aluminum industry is a basic industry, any disturbance in the consumers goods fields using aluminum will be immediately reflected in the production and consumption figures of the metal. In order to stabilize the wage situation in all of its operations, our own company recently made available substantial wage increases without price relief but which include a pledge of increased employee productivity."

Aircraft Practices To Invade Auto Industry

Detroit

• • • **Application of aircraft** design and construction techniques to motor vehicles offers possibilities of reducing weight and of improving the structural use of materials, particularly in body design, the 1946 Annual Meeting of the Society of Automotive Engineers was informed here recently.

Speaking at the passenger car body session, Mac Short, of Lockheed Aircraft Corp., and W. E. Miller, consulting engineer, said that aerodynamics is limited in its application to motor vehicle body design chiefly to drag reduction, which is not of paramount importance because of slow vehicle speeds. In the cases of reducing weight and making better uses of materials, they said, aluminum alloy sheets and castings customarily utilized in aircraft can be employed for secondary body parts and hardware. Engine hoods and baggage compartment lids were cited as practical applications. Suggestion was made that glittering bumper assemblies, now weighing up to 100 lb, could be replaced by formed dural sections weighing only half as much.

Surplus Disposal To Reach $24.3 Billion

Washington

• • • **Disposal agencies** are expected to acquire an additional $24.3 billion worth of surplus property in the next six months, according to the SPA.

Plants and industrial real property are expected to account for $7.7 billion of surplus to be disposed of by RFC. It is also estimated that the value of production materials and plant equipment involved will total $3.4 billion and consumer goods $3.7 billion.

All estimates represent original cost to the government and do not include surplus property located abroad.

Actual acquisitions from owning agencies to date, SPA reported, have necessitated a downward revision of $8.3 billion from the Aug., 1945, estimate of $32.6 billion for the year ending June 30, 1946.

These estimates, it was pointed out, are subject to revision pending determination of actual needs by the armed forces.

Ultimate disposal of these surpluses, it is expected, will see only a fractional return of original cost to the government. This is particularly true of aircraft which was the subject of a recent SPA study entitled, "White Elephants Have Wings."

A summary of anticipated surplus declarations during the two-year period ending June 30, 1947, in billions of dollars, is as follows:

Class of Property	Fiscal Year 1946	Fiscal Year 1947
Production material and plant equipment	$3.4	$2.1
Plants and industrial real property	7.7	2.9
Consumer goods	3.7	2.1
Aircraft	8.9	0.8
Airports	0.4	1.0
Marine equipment and shipyards	0.3	0.5

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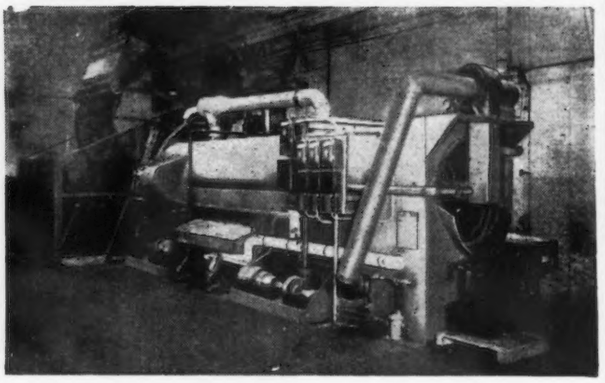

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This RANSOHOFF CLEANING MACHINE is shown with power loader for cleaning miscellaneous stampings . . . also can be fed by conveyor. A full lift-truck tote box is picked up by the power loader and discharged onto a vibrating feeding pan which feeds the work at a uniform rate into the machine. Equipped with UNI-DRAIN—drains from all tanks connect to one common drain extending from end of drain.

Note: This one machine replaced 3 old-type machines.

WRITE for the RANSOHOFF ENGINEERS to talk to you about 1946 developments.

N. Ransohoff, Inc. 1315 TOWNSHIP AVE. CINCINNATI 16, OHIO

Metallurgist Tells Makeup, Treatment Of High Speed Steels

Chicago

• • • **Composition,** heat treatment and surface treatment of high speed steels were described by Dr. George A. Roberts, chief metallurgist of Vanadium Alloys Steel Co., before a recent meeting of the Chicago chapter of the American Society for Metals.

Dr. Roberts classified the 16 different types of high speed steels now being manufactured into six main groups: The tungsten types, the tungsten-cobalt types, the molybdenum types, the molybdenum-cobalt types, the tungsten-molybdenum types, and the cobalt modification of the tungsten-molybdenum types.

Formation of hard complex carbides, with iron and carbon responsible for wear and resistance was explained as an effect of both tungsten and molybdenum in high speed steels. Secondary hardness and red hardness of the basic types of high speed steels also are improved by these elements because of their sluggishness and difficulty of precipitation. Chromium adds to hardenability, red hardness and oxidation resistance, Dr. Roberts pointed out. Hot hardness as a result of cobalt and vanadium also was dealt with, and it was indicated that with vanadium it is necessary to increase the carbon content as vanadium content is increased in order to achieve maximum performance.

Transformations occurring in heating for hardening, quenching and tempering were described in detail.

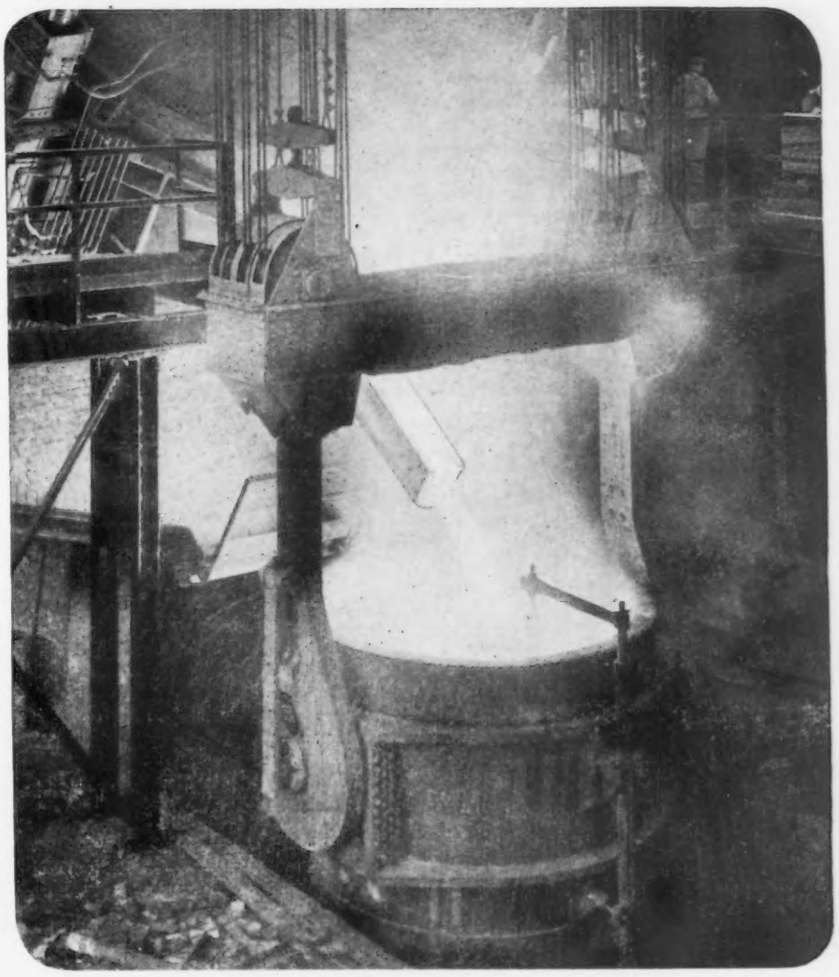
Effects of various surface treatments were discussed as follows:

(1) Nitriding: Increases hardness and wear resistance of high speed steel tools and lowers seizure characteristics.

(2) Carburizing or pack hardening: Increases wear resistance of tools and is particularly useful for certain classes of shearing or blanking dies. Both nitriding and carburizing probably cause the existence of residual surface compressive stresses.

(3) Chromium plating: Has had fair success in extensive uses

USE TITANIUM FOR STABILIZING STAINLESS STEEL



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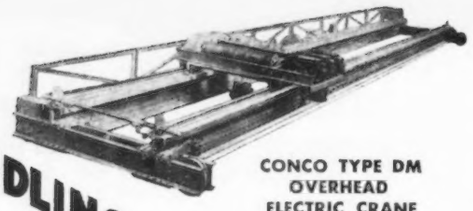

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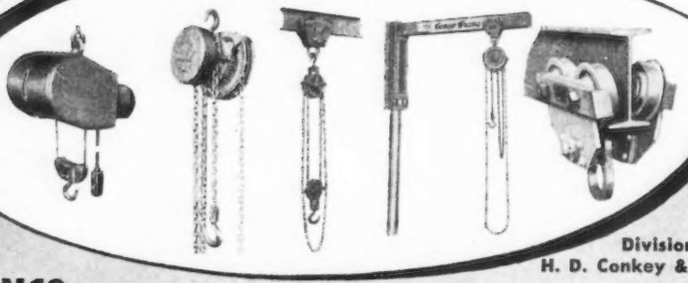

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during the war as a means of conserving tool material.

(4) Oxide coatings: Prevent seizure and lower friction.

(5) Superfinishing and liquid honing: Improve tool performance by eliminating edge roughness, distributing the load more uniformly over the cutting edge.

(6) Peening: Introduces compressive stresses into the surface of the tool, possibly improving tool life in some tools exhibiting failure by edge chipping.

The latter three methods have not been under test for sufficient length of time to permit sound judgment of their usefulness, Dr. Roberts said.

Sears Now Listing Frozen Food Units In Its New Catalog

Chicago

• • • **Sears, Roebuck & Co.** has crossed the finish line in the race of several score new manufacturers to market frozen food cabinets, and there are indications that it plans to bid for an added share of the farm refrigeration and farm equipment market.

Sears, which placed a few freezers in consumers' hands before the war, lists four sizes in its new catalog, all of them priced substantially below competitive models now marketed. Sears officials say they are in volume production and will make deliveries on mail orders after Feb. 15 and through retail stores approximately Mar. 1. Selling under the Coldspot brand, manufacture is being carried on in the St. Paul, Minn., plant of Seegar-Sunbeam Co., whose Evansville plant has been Sears' home refrigerator source.

Average selling price on catalogue sales of the freezer will be $167 for the 6 ft size; $194 for the 9 ft size; $232 for the 12 ft size; and $297 for the 18 ft size. The cabinets are rectangular, with a flat, full opening top. With a minimum temperature of only –15 deg F, they will be unsuitable for industrial use, and the company has no plans for bidding for the industrial market, Sears officials state.

Sears' next move in the refrigeration line will be the marketing of a walk-in refrigerator for the farm market. Although no announcement has been made, marketing should start in May or

June. Both the freezer and the walk-in box will enjoy the broad market afforded by extension of Rural Electrification Administration lines, it is believed.

Although highly secretive about details, it is understood that Sears has plans for broadening its farm implement line to place it in a better competitive position against full line manufacturers. Sears stopped manufacture of its farm tractor in 1940, and since has sold only garden tractors. Most implement models have been of the light type, with a considerable portion of the volume in horse-drawn implements. Most implements marketed by Sears are manufactured by the company's Bradley plant at Kankakee, Ill., although some are produced by outside manufacturers. The company is taking definite steps to assure purchasers of both freezers and implements of a supply of repairs through retail and mail order channels, lack of which in the past has held down tool sales, it is indicated.

USES Reports Rise In Factory Employment

Cleveland

• • • **Factory employment** in the Ohio-Michigan-Kentucky region, based on reports from 1700 plants in the three states, will total 2,250,000 by February, an increase of 12½ pct over the October figure, according to J. Kimball Johnson, regional director of the U.S.E.S.

"However," Mr. Johnson pointed out, "the 2,250,000 still would be 415,000 lower than employment in July 1945, and about 715,000 below the peak wartime employment which was registered in Nov. 1943.

Total unfilled job openings listed with the 200 local offices of USES in the region are now approximately 60,000, representing a decline of about 35 pct from Nov. 1, 1945. Nearly 20 pct of these openings are for women, while the majority of current openings for men are for highly skilled workers in demand by numerous industries.

Mr. Johnson said the increase in employment does not reflect a corresponding decrease in unemployment, since returning servicemen have been adding and will continue to add large numbers to the labor force.

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1945 Mineral Production Shows Drop

Toronto

• • • **Mineral production in** Canada for 1945 had a total value of $479,587,911, a loss of about one pct below the $485,819,114 reported for the year immediately preceding, according to the Dominion Bureau of Statistics. Total metal production of Canada to the end of 1945 reached the impressive figure of $11,247,443,257.

Gold recovery at $102,470,330 was approximately $10,000,000 below the value of 1944, and was only 49.2 pct of the all time high record made in 1941, and reached the lowest point since 1930. Lead recorded substantial gains in quantity and value over 1944. Zinc, though 41,000,000 lb under the previous year's mark, reached an all time high in point of value because of a rise in price. Copper and nickel reflecting postwar cutbacks and suffering from the acute labor situation, were lower in quantity and value. Iron ore production practically doubled that of 1944, owing to inauguration of continuous shipments by Steep Rock Mines. Algoma Ore Properties in the Michipicoten district of Ontario shipped beneficiated ore to Sault Ste. Marie, while the Josephine Mine in the same area made its first contribution to iron ore production of the province last year. Substantial gains were registered in bismuth, cadmium, cobalt, selenium, tellurium and tin. With the close of the war strategic metals like molybdenum and chromium fell off in demand, while mercury and tungsten concentrates disappeared from the list.

The year 1945 witnessed considerable change in the outlook for markets for the products of Canada's metal mines. At the beginning of the period, the war was at its height and every effort was being made toward its termination. Mines producing base metals were in full swing. With the cessation of hostilities in Europe in May and in Japan in August, readjustments became necessary and production of some of the metals tapered off during the latter months of the year.

Following are comparative production figures for the past three years: The 1945 figures are preliminary, others final.

	1945	1944	1943
Antimony, lb.	1,680,000	1,937,935	1,114,166
Arsenic, lb.	2,031,471	2,627,022	3,153,538
Bismuth, lb.	210,000	123,875	407,597
Cadmium, lb.	637,000	526,970	786,611
Chromite, tons	5,662	27,054	29,595
Cobalt, lb.	109,123	36,283	175,961
Copper, lb.	476,284,746	547,070,118	575,190,132
Gold, fine oz.	2,661,567	2,922,911	3,651,301
Iron ore, tons	1,134,808	553,252	641,294
Lead, lb.	345,455,080	304,582,198	444,060,769
Magnesium, lb.	7,449,367	10,579,778	7,153,974
Mercury, lb.	.....	735,908	1,690,240
Molybdenum, lb.	976,160	2,127,508	784,715
Nickel, lb.	243,956,502	274,598,629	288,018,615
Palladium, etc., oz.	155,600	42,929	126,004
Platinum, oz.	162,000	157,523	219,713
Selenium, lb.	419,000	298,592	374,013
Silver, fine oz.	12,866,597	13,627,109	17,344,569
Tellurium, lb.	42,000	10,661	8,600
Tin, lb.	850,000	516,626	776,937
Titanium ore, ton	13,306	33,793	69,437
Tungsten Con., ton	.....	886.745	1,508,621
Zinc, lb.	509,638,004	550,823,353	610,754,354

Locomotive Production Swings Into High Gear

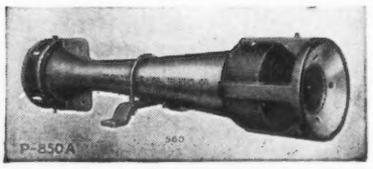
Toronto

• • • **Canadian Locomotive Co.** has received an order from the Government of France for the construction of 40 locomotives, to be built at the company's Kingston plant, William Casey, president, announced. Payment for the locomotives will be provided through the loan to France recently authorized by the Canadian Government totalling $235,000,000 under the Export Credits Insurance Act.

Mr. Casey further stated that the balance of the order for India would be completed next month. This order covered 115 locomotives which brings the total engines for India to 190 to be built by the company. Upon the completion of the Indian order, Canadian Locomotive Co. will start on an order for 60 locomotives for Belgium, which also will be paid for out of Canadian credits, it is understood. Following the Belgium order the company will turn out 20 locomotives for the Canadian Pacific Railway Co., and when this order is finished work on the French contract will be commenced. Thus, the company is assured of capacity operations well into 1947.

NATIONAL AIROIL FUEL OIL - GAS BURNERS

"AIROCOOL" GAS BURNERS



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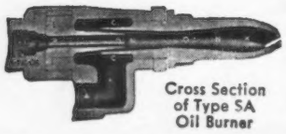
They are made, as shown in the illustration, in sizes 4", 5", 6" and 8". Also, in a slightly different model for sizes 1" to 3".

All "Airocool" gas burners can be furnished with our patented flame stabilizing nozzle, having an integral gas pilot and a refractory protected face. "Airocool" nozzles have long life and give a high turn down rate without "burning back" in the venturi.

Type "SA" Oil Burner . . .



Cross Section of Type SA Oil Burner

burns gas house tar and residuums

Employing either gravity or pressure feed, with steam or air as an atomizing agent, the type SA is an economical and trouble-free burner that has a wide range of applications. Steam consumption is very low. The burner requires only minimum maintenance and can be operated continuously without clogging or interruptions for cleaning. Oil pressure and temperature requirements are low. This unit burns efficiently the cheapest grades of oil and tar.

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New Production Methods To Offset Costs Rise In Postwar Operations

Detroit

• • • **Engineering detours** of increased materials, labor, and other production costs were mapped at the production session of the Society of Automotive Engineers annual meeting here last week. One comprised the recommended use of air-operated fixtures said to increase some operations in production by more than 100 pct. The other provided for extensive application of modern honing techniques to save time, material, labor and expense, to improve product quality and to assure reproducibility in processing.

S. Johnson, Jr., of Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio, declared that air-operated fixtures not only increase production per man hour, but contribute to working safety. He described the application of air-operated fixtures to pneumatic inspection tests on relay valve assemblies, with resulting increase in production of more than 100 pct. Application to a hydraulic arbor press, operated by women, was said to enable the worker to produce 10 times as much daily and with minimum fatigue. Application to the process of babbitting compressor connecting rods was reported to have resulted in first-year savings of $5800 plus cost of installation.

Modern honing machines and techniques permit of precision sizing, according to Lawrence S. Martz and Douglas T. Peden, of Micromatic Hone Corp., Detroit. They reported that the objective of 0.0005 in. uniformity, long a challenge to industry, has been achieved by honing techniques which consistently hold operations to 0.0003 and even 0.0002 in.

In such processes as stock removal, they said, honing removes 25 to 30 times as much metal as formerly, and does the work six to eight times faster. With the new techniques, it was explained, large amounts of material are saved, and any kind of surface finish, bore wall quality, or controlled surface roughness may be produced and accurately reproduced.

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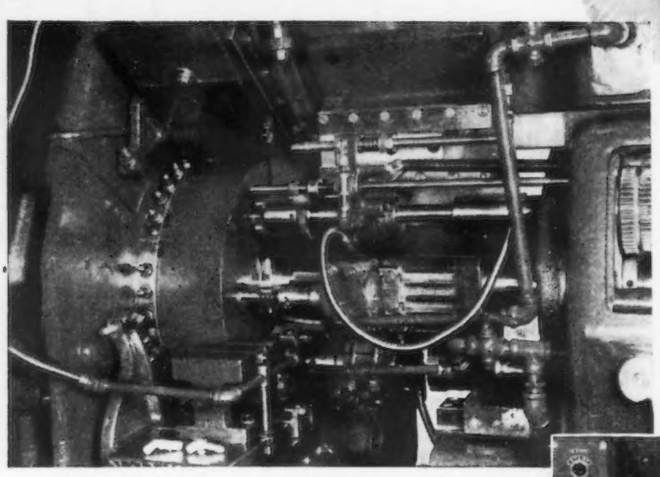
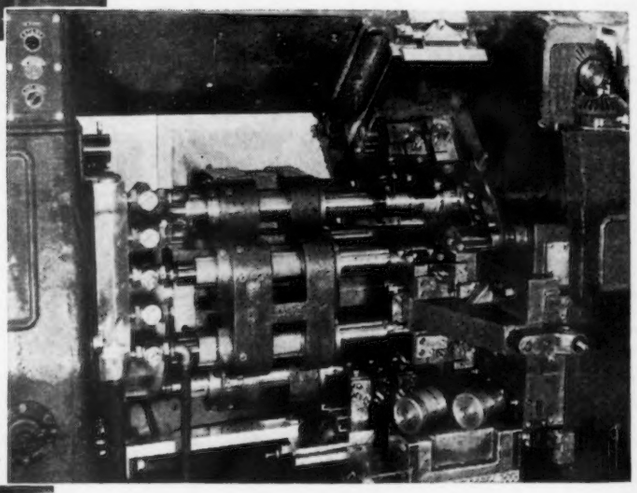


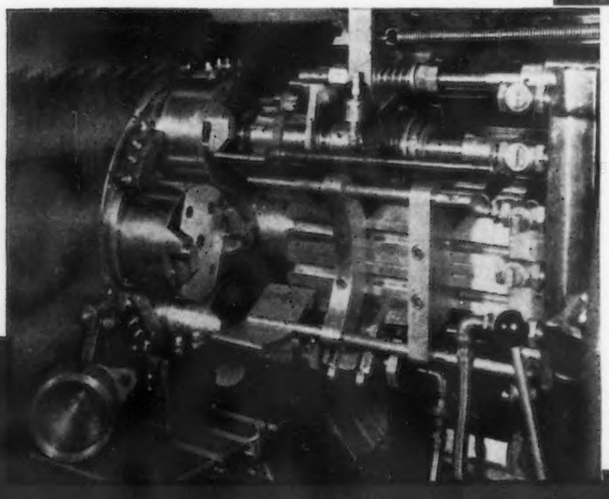
ON AIRCRAFT PARTS

Aluminum Alloy Die Cast Fitting —11 operations on 5¼"—6 Spindle machine—machining time less than 10 seconds. Must have smooth finish and near perfect concentricity of bevel and straight fitting surfaces. Pressure-tight threads cut to class three-plus fit with 1 1/16" Versotool. Machine equipped with air chucking mechanism.



ON PISTONS

Cast Iron Piston—12 finishing operations on 6"—8 Spindle machine. Carbide tipped tools —2 pieces per cycle of 27 seconds, double-indexing finishes two pieces at once (13½ seconds per piece). Multiple position toolholders provide for varying location of ring grooves or different groove widths, for other piston sizes.



ON AUTOMOTIVE PARTS

Malleable Iron Shock Absorber Base—(8¼" across flange x 3½" long)—22 operations on 8"—6 Spindle machine—machining time 51 seconds with carbide tools. 4¾" Namco Collapsible Tap—piloted for very close concentricity of thread diameter with O.D. Bore to bottom with square corner finish (no radius allowed). Bore and O.D. to exceptional limits of concentricity. Hook-bolt type hydraulic chucks used.